AMERICAN ARTISAN

WARM AIR HEATING • AIR CONDITIONING AND SHEET METAL DIRECTORY NUMBER

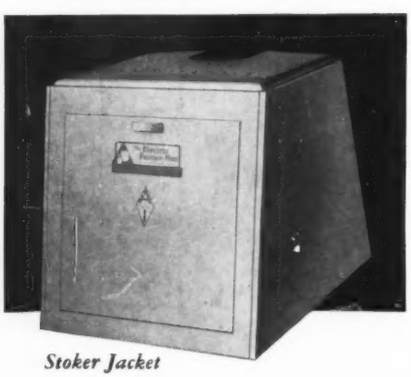
JANUARY

1936

ESTABLISHED 1880

Water Heater Cabinet

Gas Boiler Jacket



Stoker Jacket

BEAUTY BOOSTS SALES

when Berger tailors steel to individual jacket needs

• Where beauty marches hand in hand with utility, new sales objectives are reached. Broader markets are opened . . . greater buyer interest is aroused . . . and a wider field of general appeal is established.

Let Berger help make your old products more popular and profitable, and your new products instantly successful. Increased utility and arresting beauty can be built into jackets for boilers, oil burners, stokers, etc., through the capabilities of Berloy engineering service.

Don't let exterior design and appearance handicap a product otherwise endowed with important factors of salability. Meet and beat competition with *Beauty* as an integral part of your product's design.

Berger offers in one organization the services of a group of expert designers and metal-working specialists, supported by outstanding facilities for the manufacture of sheet metal products of every description. *Consult Berger now—there is no obligation!*

THE BERGER MANUFACTURING CO.
CANTON, OHIO • Division of Republic Steel Corp.

Oil Burning

Now • • any man who can install furnaces can make successful Blower Installations every time *without outside help!*

1 Unit for 90% of the jobs

Plenty of Capacity for any job

Ends all "Engineering"

100-Speed Control gives 100 different capacities--just turn the switch to the exact capacity needed.

and we GUARANTEE the job if you follow these simple rules

The Hold-Heet Blower-Filter Unit No. B1F is a large, substantial, good-looking piece of equipment with adequate capacity for all the applications outlined above. It is the finest equipment of its kind ever offered on the market. Do not compare with the small-sized units of inadequate capacity which competitors offer in the Hold-Heet price range. Hold-Heet reserve power insures ample, adequate capacity for every job. You simply damper down the various runs to balance deliveries as required throughout the house and adjust the 100-speed controls to the volume of the output that that job requires—Nothing could be simpler—You can't go wrong on an installation—Hold-Heet guarantees satisfactory results. It is up to you to make the most of this opportunity and start collecting the handsome profits which are to be made in the blower business.

For All Gravity Jobs where Furnace Firepots are from 18 to 28-inch.

On any old gravity job that is heated after a fashion with a furnace having a firepot of from 18" to 28" in diameter inclusive, we will guarantee that the installation of a Hold-Heet Blower-Filter Unit No. B1F will give satisfactory heat delivery to every room in the house that has a warm air leader pipe. You simply cut it into the present cold air return system—an average of four hours labor is required. The only qualification we make is that where the present installation has restricted cold air return areas, the minimum area in any part of the connecting ducts and orifices that are provided shall not be less than the minimum area in any part of the present existing cold air duct system.

For Small Duct Forced Air Installations Follow these figures

Firepot Diameter	Minimum Warm Air Leader Pipe Area	Minimum Cold Air Return Area
18"	200 sq. in.	150 sq. in.
20"	250 sq. in.	200 sq. in.
22"	300 sq. in.	250 sq. in.
24"	350 sq. in.	300 sq. in.
26"	450 sq. in.	375 sq. in.

See our complete exhibit of all kinds of Air Conditioning Equipment — Booth 407 International Heating and Ventilating Exhibition.

Hold-Heet B1F Air-Conditioner

(Formerly Catalog No. ACA1.) This unit is supplied complete—assembled in 28" x 31" x 52" heavy rigid steel cabinet with attractive gray enamel finish. ¼ h.p. Ballentine Capacitor Motor with direct-connected 23" Planoidal Blower, four 20" x 30" Hold-Heet Filters, Hold-Heet rod and tube type Fan-Switch, Control box with 100-speed control — All for dealer cost of..... **$50.50** F. O. B. Chicago

Don't pass up these BIG PROFITS

One Chicago dealer has already sold 30 of these units. An Akron dealer who ordered his *first* B1F unit on August 14th has just made his twentieth installation.

These are typical experiences of dealers everywhere who introduce this beautiful new unit. The B1F wherever demonstrated sells itself. No prospect "willing to be shown" can resist all its features.

Act NOW — *Send in This Coupon*

RUSSELL ELECTRIC COMPANY
342 W. Huron Street, Chicago, U. S. A.

FREE Blower Sales Manual and Catalog with Installation diagrams.

☐ Dealer Price List
☐ Set of Large Photographs

Enclosed find check for $50.50—RUSH B1F so I can get started.

Send to .....

Name of Firm.....

Address .....

City ..... State.....

Name of Preferred Jobber.....

This Unit is as easy to sell as to install, just tell these facts and you'll sell jobs

Every FURNACE Needs a BLOWER to insure most efficient, satisfactory operation under all conditions. Every home owner is now paying for such equipment whether they enjoy its advantages or not. The University of Illinois research data states the efficiency of any furnace may be increased at least 25% by the use of a suitable blower. Not only will there be substantial fuel economies, but the University data further shows that the capacity of any furnace may be increased at least 30% by the installation of a suitable forced air unit. This means that countless existing inadequate installations will have adequate heating capacity when the Hold-Heet Blower-Filter Unit is installed.

RUSSELL ELECTRIC CO. *Mfrs.* **342 W. Huron St., Chicago**

E M&N. 23/VII/37

In This Issue

Typical of the operations of larger shops is the procedure described on page 35 detailing interesting facts about the products, office forms, shop operation of R & T Company in Cleveland.

*

Built to last 100 years! That was the specification for the Hayden Planetarium. Copper outside, stainless steel inside, met the specifications. See page 38.

*

Some months ago we made a survey to find just how many uses there are for bright metal. The results surprised us. Perhaps it will also surprise you. The tabulation begins on page 42.

*

A special feature of this January issue is the Heating and Ventilating Exposition show section beginning on page 51. We give you meeting programs, maps showing how to get to the show, products on display arranged so you can pick out those items of most interest.

*

Each year this January issue contains the industry's only directory of products, manufacturers and trade names. The thousands of names are brought up to date every year so that the directory is as up-to-date as tomorrow's newspaper. This year's directory occupies 48 full pages and begins on page 155.

*

This month's Air Conditioning Section has been a real pleasure to get together. The two leading articles are likely to cause comment for several years to come.

*

The first article, by G. A. Voorhees, presents a corrected Friction Chart and a method for sizing ducts from the chart. We've all been waiting for a method like this. The author takes a typical system and explains how to lay out the ducts.

*

The second, and equally important article, is by S. Konzo and begins on page 91. Mr. Konzo has gone back to basic data, added information gathered at the Research Residence and has set up three tables from which the pressure losses of any average system can be read directly. Itemized and totalled the figures tell us just how much resistance to anticipate.

*

And a third article, timely in the extreme, deals with this elusive subject of humidification. The author, O. J. Kuenhold takes accepted data and makes four charts. These charts explain why we have trouble with humidity.

AMERICAN ARTISAN

With which is merged

FURNACES AND SHEET METALS AND Warm-Air Heating

Covering All Activities in

Gravity Warm Air Heating — Forced Warm Air Heating
Sheet Metal Contracting — Ventilating
Air Conditioning

J. D. Wilder, Editor

Vol. 105, No. 1 — January, 1936 — Founded 1880

CONTENTS

THE AIR CONDITIONING SECTION

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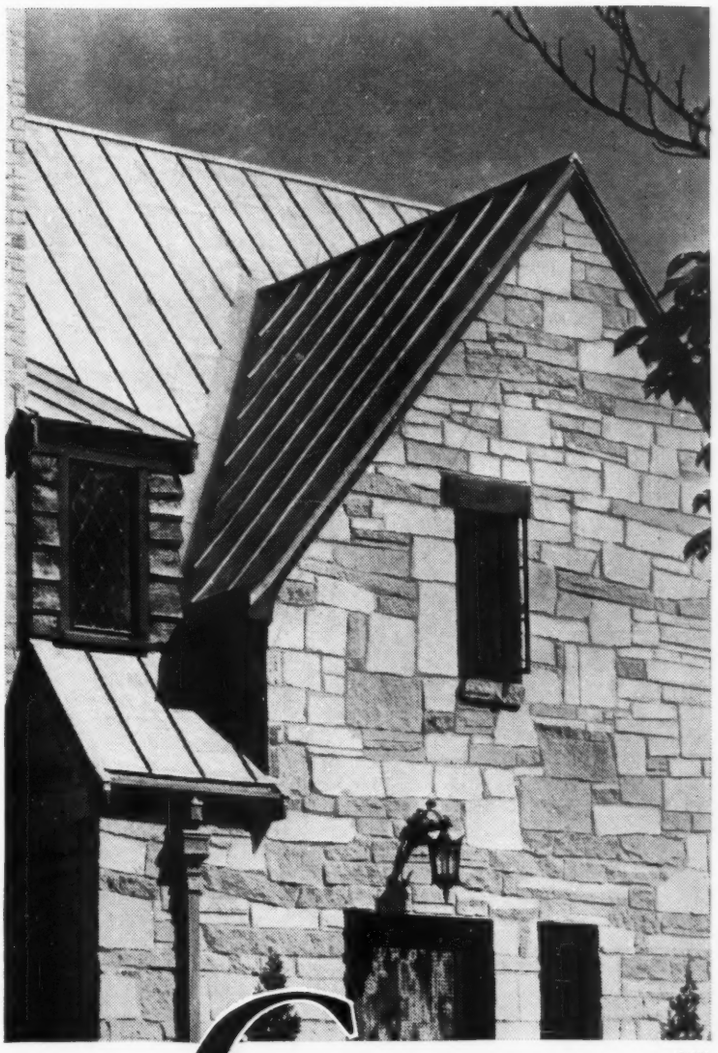
More than 8,000 Copies of this Issue are being distributed

Public Interest in
ANACONDA *Economy*
COTTAGE ROOFING
...means new business for YOU

INTEREST in the new Anaconda 10-oz. *Economy* Cottage Roofing (announced in the June, 1935 issue of this magazine) has been even greater than we hoped for. Hundreds upon hundreds of inquiries have come in from wide-awake homeowners and prospective builders.

Yes, the public is definitely interested in a roof of durable, *rustless* copper, costing no more than good quality commercial slate. The National Housing Act is doing its helpful part. Architects favor this new type of roofing. And our own advertising in American Home, House & Garden, House Beautiful and other magazines is being read in more than a million homes!

Distributors of Anaconda Copper carry Anaconda 10-oz. *Economy* Cottage Roofing. For price information on these new roofing sheets (which can also be furnished lead coated) ask your regular supply house. Cash in on the metal roofing opportunity that is yours today!



35124

ANACONDA
From mine to consumer

Anaconda Copper

THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut • *Offices and Agencies in Principal Cities*

Easier to Sell in 1936!

SU

WARM

• • • AIR

NEW PRODUCTS

Above is illustrated one of the new 1936 model Sunbeam Air Conditioning Units. They are outstandingly attractive in appearance — and are as efficient as they are beautiful. There are 3 different models: One for coal: One for gas: And finally, one for oil which can be provided equipped with oil burner!

Casings which are made of heavy 20 gauge cold rolled furniture steel are finished in glossy, smooth, green baked enamel. Corners are gracefully rounded. All bolts, nuts and screws are concealed. Appearance now matches the mechanical excellence of Sunbeam Air Conditioning equipment — excellence which is the result of more than 50 years of manufacturing experience. Sunbeam dealers will make easier sales and increased profits this year selling the most attractive Unit on the market.

SUNBEAM

—AIR FURNACES AND CONDITIONING UNITS

NATIONAL ADVERTISING

This year, national advertising will tell millions of home owners, home builders, home buyers, architects, building contractors, mortgage institutions and others about the benefits of Sunbeam Air Conditioning. This advertising is being carefully directed to the choicest prospects for air conditioning, individuals who are primarily interested in homes and household equipment. Large size advertisements will carry these selling messages consistently during 1936.

Sunbeam Dealers will find sales easier and profits greater with Sunbeam National advertising helping them.

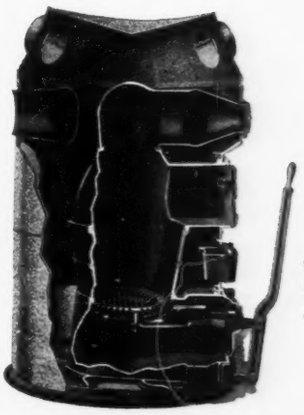
NEW LOW PRICES

Sunbeam recognizes that price has been an important factor during the past few years in a large percentage of sales — and is still a vital consideration. So 1936 prices are based on 1936 standards of value. The sharp reductions, which will decrease buying resistance, are made possible by the large volume in which Sunbeam Furnaces and Air Conditioning Units are being produced. In 1936, Sunbeam Dealers can meet price competition without demanding a premium for Sunbeam quality.

●

F. H. A. FINANCE PLAN

There is no red tape to the Sunbeam Finance Plan approved by F. H. A. There is only one statement to be filled out — right in the privacy of the buyer's home. Nobody enters into the transaction, before the statement is submitted, except the Sunbeam Dealer and his customer.



Sunbeam Cast Furnace

6 TYPES OF FURNACES

There is a type of Sunbeam Furnace for every prospective buyer. Besides the cast iron heating plant, there are 2 different lines of steel furnaces, one of them available in special oil burning models. Three different types of gas fired furnaces complete the line of Sunbeam gravity heating plants — a gravity warm air furnace for every home; for every fuel; and for the income of every prospective buyer.

THE FOX FURNACE COMPANY

ELYRIA, OHIO • *A Division of* AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Sunbeam's established position of leadership in the warm air heating and air conditioning field will be greatly enhanced by the 1936 Selling Program — the finest selling program, in our opinion, ever offered to furnace dealers. The opportunities for sales will be increased many-fold over previous years. And Sunbeam Products will be easier to sell than ever before.

The coupon will bring you information on how Sunbeam can help you obtain substantial profits this year and every year. Sign and return it today.

THE FOX FURNACE COMPANY
ELYRIA, OHIO

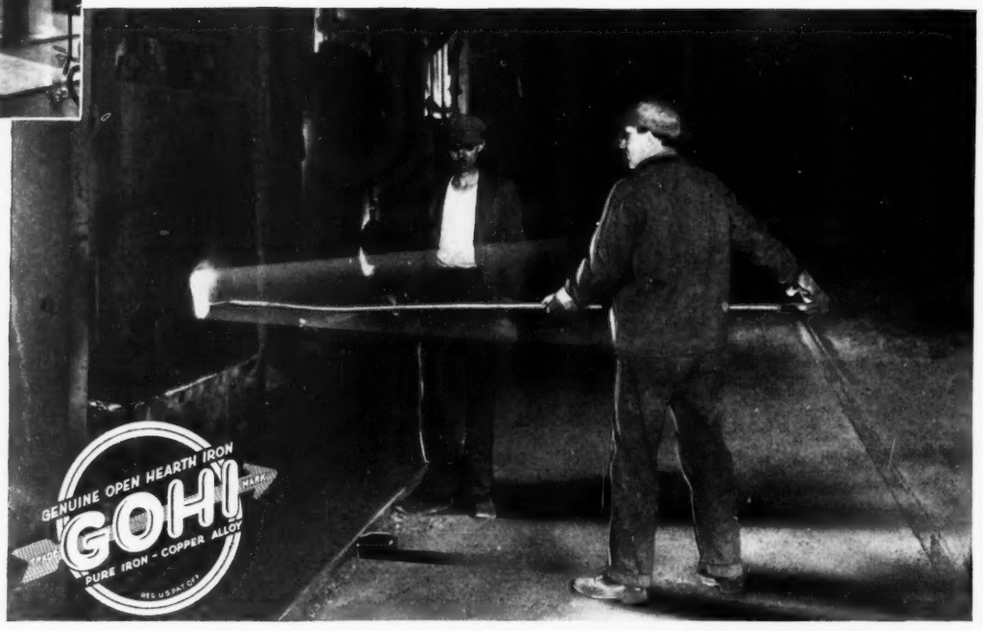
We are interested in a line of furnace and air conditioning equipment that will enable us to compete successfully for the larger volume of business that promises to be available this year. Please send complete details.

Name .....

Address .....

State .....

the Zero Hour



WHEN the heat of metal reaches its top temperature, its maximum state of purity, and the furnace is almost ready for tapping, a final sample is taken from the seething molten mass and rushed to the laboratory for testing. This last exacting test determines the quantity of copper required to bring the heat to the typical GOHI analysis. Only ***after*** the addition of this copper does the metal become GOHI Pure Iron-Copper Alloy.

It is the copper content that gives GOHI its phenomenal resistance against wear, weather and corrosion, that makes it the longest-lived, low-cost ferrous metal, the first choice of leading sheet metal contractors.

For more than a quarter of a century the analysis of GOHI Pure Iron-Copper Alloy has remained unchanged. During these years, thousands of buildings have been permanently protected with GOHI Pure Iron-Copper Alloy Sheet Metal Building Materials. The correctness of the GOHI analysis is proved by the unmatched service given by GOHI under the severest conditions. Complete details and typical analysis will be sent on request.

GOHI

GOHI Pure Iron-Copper Alloy sheets are available in all sizes and gauges. Produced exclusively by The Newport Rolling Mill Company, Newport, Kentucky.

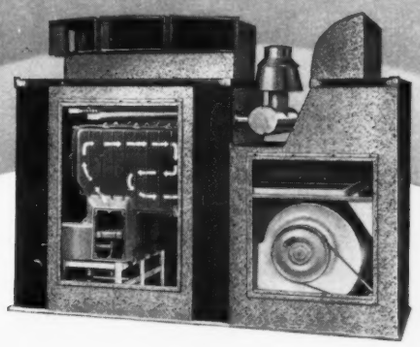
Information on complete line of fabricated sheet metal building materials is yours for the asking.

PRONOUNCED "GO-HIGH"

SHEET METAL

THE NEWPORT ROLLING MILL COMPANY . . . NEWPORT, KENTUCKY

Moncrief "CBF" Gas Air Conditioning System



Moncrief Aristocrat Oil-Fire Air Conditioning System

Moncrief Aristocrat Air Conditioning System

Cast or steel furnace heating unit

Let MONCRIEF Help You Win in 1936

• Every succeeding year has shown big advances in the Moncrief line. Now, at the beginning of 1936, Moncrief Dealers have at their command a Moncrief Furnace and a Moncrief Air Conditioning System for every house heating need, the best that air conditioning engineering can devise. Our Engineering Department is an important feature of Moncrief Service.

Plan now to make the most of the opportunities which the new year presents. Get the particulars of the Moncrief Proposition. Write today.

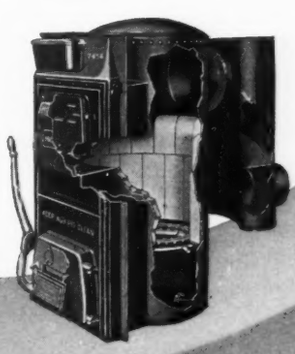
We supply everything used on a warm air heating job.

THE HENRY FURNACE & FOUNDRY CO.

3473 E. 49TH STREET • CLEVELAND, OHIO

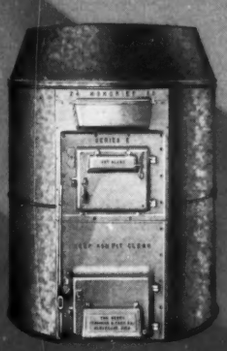
Series "F" Cast Furnace

Series "D" Steel Furnace

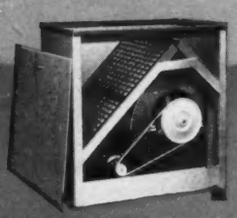


Series "S" Steel Furnace

Series "C" Cast Furnace



Series "E" Steel Furnace



Moncrief Blower-Filter Unit

Series "B" Gas Furnace

THE AMERICAN ROLLING MILL COMPANY

Makers of ARMCO Stainless Steels, Ingot Iron, Steel and Copper-Bearing Steel Sheets, Plates and Strip.

EXECUTIVE OFFICES: 730 CURTIS STREET, MIDDLETOWN, OHIO

District Offices:

Atlanta, Ga., 1437 Citizens & Southern Nat'l Bank Bldg.
Boston, Massachusetts, 201 Devonshire St.
Buffalo, New York, 509 Seventeen Court St. Bldg.
Chicago, Illinois, 1122 Straus Bldg.
Cleveland, Ohio, 1516 B. F. Keith Bldg.
Dallas, Texas, 1110 Santa Fe Bldg.
Detroit, Mich., 5-261 General Motors Bldg.
Kansas City, Missouri, Sheffield Station
Middletown, Ohio, 730 Curtis Street
New Orleans, La., P. O. Box 480
New York, N. Y., 50 Church Street
Philadelphia, Pa., 2020 Lewis Tower
Pittsburgh, Pa., 1632 Oliver Bldg.
San Francisco, Cal., 540 Tenth Street
St. Louis, Mo., 1734 Ambassador Bldg.

Distributors in All Principal Cities Can Supply Contractors' Requirements Promptly.

ARMCO PRODUCTS

ARMCO Stainless Steels • ARMCO 18-8 and ARMCO 17 supplied in sheets, strip, plates, in all standard sizes, gages and finishes.

ARMCO Ingot Iron and Steel Sheets • Galvanized (flat and corrugated), Hot-Rolled, Hot-Rolled Annealed and Furniture grades.

ARMCO Ingot Iron and Steel Plates.

Roofing and Siding (Galvanized ARMCO Ingot Iron, Steel and Copper-Bearing Steel) • Roll, V-Crimp, Standing Seam, Pressed Standing Seam, Corrugated; Weatherboard, Pressed Brick and Rock Face Siding.

Manufactured Building Products made of ARMCO Sheets • Gutters, Downspouts, and other Roof and Roof-Drainage Fittings, are carried in stock by ARMCO Distributors throughout the country.

ARMCO STAINLESS STEELS

ARMCO Stainless Steel Sheets are made to highest metallurgical standards in two popular grades—ARMCO 18-8 and ARMCO 17. Both metals rank high in corrosion resistance, workability, uniformity, and perfection of surface finish. They offer the sheet metal contractor an excellent opportunity to broaden and diversify his business, since one or the other of these two improved metals can be used for any purpose where appearance, cleanliness and permanence are required. There are six different surface finishes, ranging from "white-pickled" to bright "mirror-finish." All are available in the forms of sheets, strip, and plates. Write to us for complete information.

ARMCO INGOT IRON

ARMCO Ingot Iron was the first low-cost iron made especially to resist the general wasting action of rust. Galvanized Ingot Iron sheets have the additional protection of a generous coating of high grade zinc, insuring the utmost durability in galvanized sheet metal.

Forms Easily Because Ductile • Again, the careful refinement of Ingot Iron makes it uniformly soft and workable, free from irregular hard spots that interfere with accurate forming to intricate designs. Sheet metal workers have long praised the consistently easy-forming qualities of Ingot Iron, and have found it an important factor in reducing waste and speeding shop work.

Solders Quickly and Firmly • Solder applied to galvanized Ingot Iron takes firm anchorage. Little preparation is required. If the metal is dry and clean and a suitable flux is used, the solder will form a strong bond with the parts to be joined.

Welds Readily and Soundly • Another advantage of the uniform refinement of Ingot Iron is its excellent welding properties. It melts evenly under welding temperatures and makes a sound, flawless weld that is as strong and rust-resistant as the surrounding area.

Saves Money for Your Customers • On a cost-per-year basis, Ingot Iron has proved its ability to save money for builders and home-owners. This evidence is found in the records of twenty-nine years of satisfactory service—the longest record of actual service of any low-cost, rust-resisting sheets and plates.

HOW TO IDENTIFY INGOT IRON

The ARMCO triangle together with the words "Ingot Iron," appears on every sheet of ARMCO Ingot Iron, both galvanized and hot-rolled uncoated grades. In each instance the gage is shown at the right of the triangle, which is placed three times diagonally on every sheet. Be sure to see the ARMCO trademark before you put delivered sheets into stock, and especially before you install work. It means protection of your interests and authorized ARMCO Distributors as well as those of your customers.

STANDARD GAGES AND SIZES

ARMCO Ingot Iron Galvanized sheets, as well as ARMCO steel and copper-bearing steel sheets, are carried in stock by distributors and jobbers in the following sizes: Gages—16, 18, 20, 22, 24, 26 and 28. Widths—24, 26, 28, 30 and 36 ins. Lengths—96 and 120 ins.

ARMCO Ingot Iron corrugated, galvanized and black sheets for roofing and siding purposes are made with 5, 3, 2½ and 1¼ inch corrugations. For general building purposes we recommend and carry in stock a 2½ inch corrugated sheet 26 inches wide (after corrugating) for siding, and 27½ inches wide (after corrugating) for roofing. These sizes cover 24 ins. in the width and allow for a one-corrugation lap for siding and a one and one-half corrugation lap for roofing. These sheets may be obtained from stock in the following sizes: Gages—20, 22, 24, 26, 28. Widths—26 and 27½ inches. Lengths—60, 72, 84, 96, 108, 120 and 144 inches.

All of the above sizes are termed standard sizes because they are carried in stock and used most frequently. All grades of sheets may be obtained in special sizes when an order is placed for 2,000 lbs. or more of a size.

WHERE TO GET ARMCO PRODUCTS

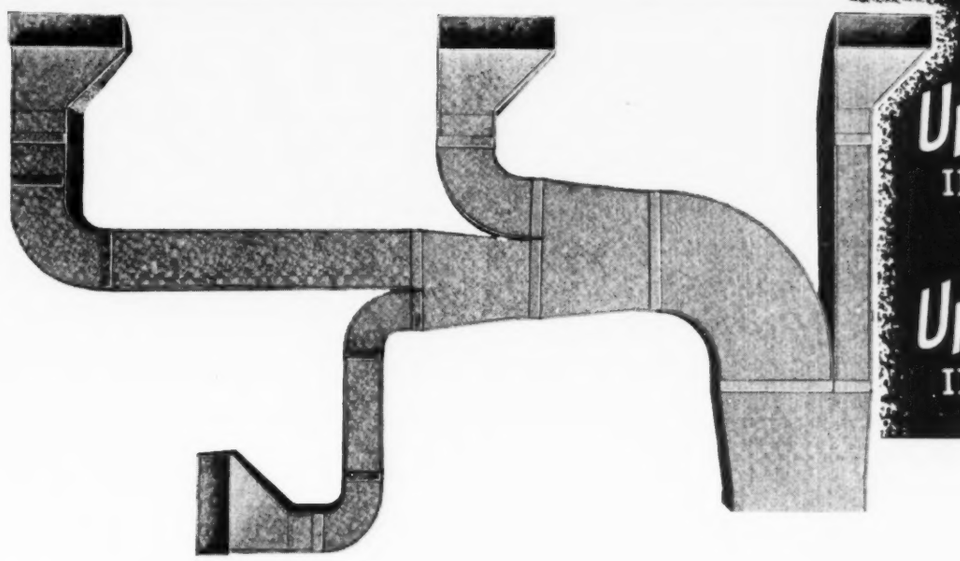
Leading distributors and jobbers in all parts of the United States and Canada sell ARMCO galvanized sheets, galvanized formed products and annealed and hot-rolled sheets and plates. Names and addresses of ARMCO distributors and jobbers in any given territory will be supplied on request. Write to the nearest office listed above.

SALES-HELPS FOR CONTRACTORS

Every sheet metal contractor may have a free subscription to Ingot Iron Shop News, a monthly business-building paper that deals with all departments of his business—management, selling, mechanics, accounting, and many other important subjects. Additional business-helps are provided, such as job cards, seasonal mailing pieces, blotters, advertisements, direct mail campaigns, folders and booklets. Ingot Iron Shop Headquarters has a wealth of information and material that, wisely and consistently used, can be turned into profitable business.

All these aids to better business are provided through ARMCO Distributors. For further information either write to the Ingot Iron Shop News, 730 Curtis Street, Middletown, Ohio, or get in touch with an ARMCO Distributor. There is one near you.

HANDY PIPE



Up to date IN 1896
Up to date IN 1936

Ever since 1894 HANDY PIPE has been the Standard. Its design . . . Its materials . . . Its construction . . . have always been RIGHT.

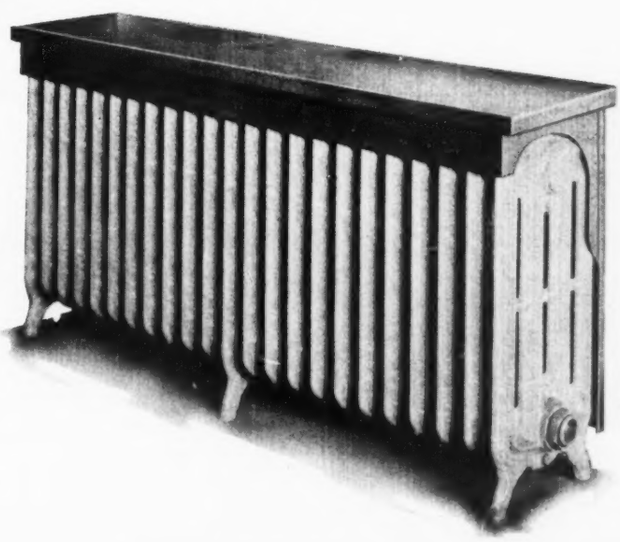
Today HANDY offers you everything from standard fittings for ordinary furnace installations to expertly designed duct-work for your most elaborate forced, conditioned-air jobs.

IF YOU HAVEN'T OUR CATALOGUE No. 49 AND ITS DUCT-WORK SUPPLEMENT, WRITE FOR THEM AND BE READY FOR THE PROFIT YEAR WITH THE PROFIT LINE!

Make Money on RADIATOR SHIELDS

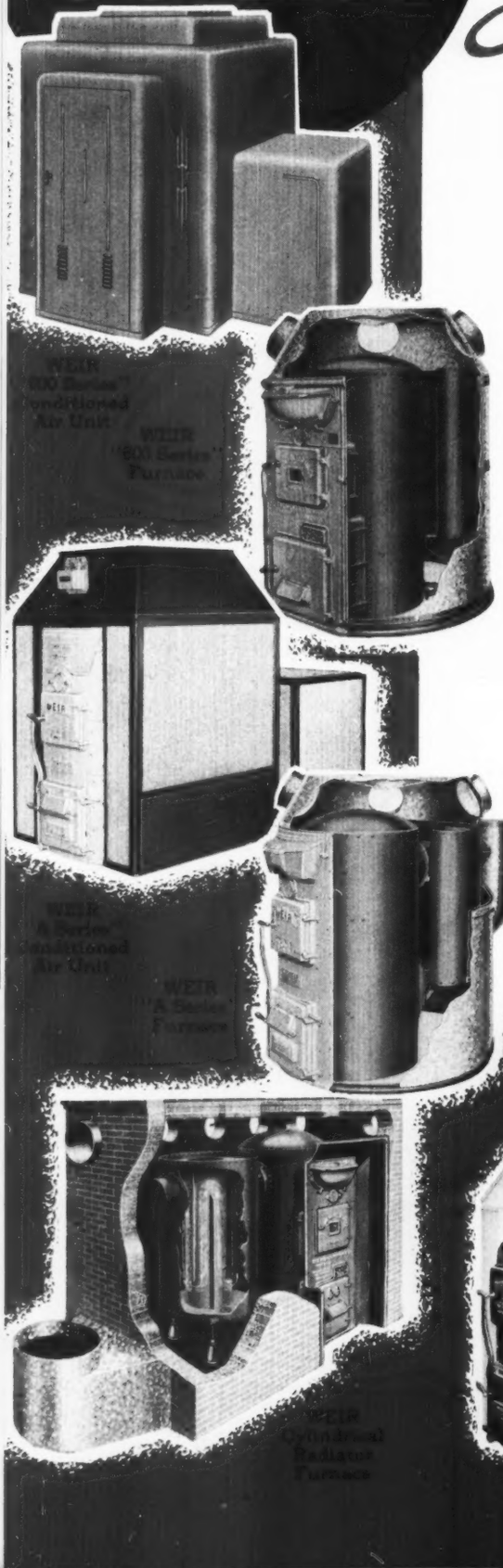
MOST OF THE SEASON IS STILL AHEAD OF YOU . . .

Get a profit for yourself from those who use radiator heat! Sell them shields to protect their walls and draperies and to supply necessary humidification. (The "Superior" model shown has a hinged cover and water-pan.) A complete line of shields and enclosures is available in sizes for all radiators. See our Catalogue—or write for full details.



MEYER & BRO. CO., PEORIA, ILL.

WEIR *Lead*



UNQUESTIONABLY the **WEIR-MEYER** lines are clear out in front of the Warm Air Heating field. They are the fastest-selling complete lines of Warm Air Heating equipment in America to-day—with more exclusive economy and convenience features—more features that make sales—and you ride to **local** leadership on **WEIR-MEYER national** leadership!

For more than a half century the names **MEYER-WEIR** have been synonymous with the highest quality as well as outstanding leadership. And to-day these lines hold their position of superiority and leadership as distinctly as ever, if not more so.

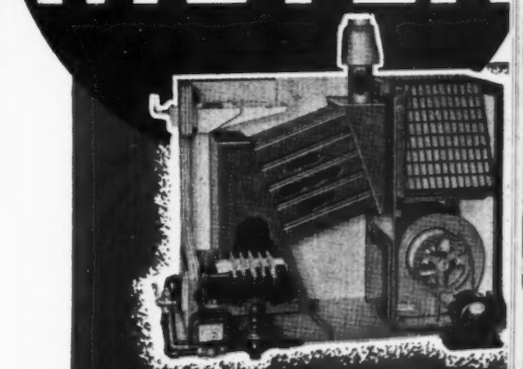
In 1936 our Dealers are "going to town" with new styling —new eye appeal—new featured improvements—effective

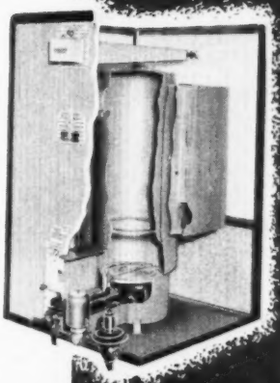
WITH THE *Leading Lines* MEYER

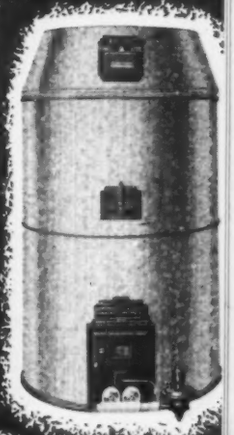
new sales helps—low-cost, "no-red-tape" financing plans, —tried prospect-finding ideas—plans that will bring them up to next Christmas happier and richer than they have thought in recent years they would ever be again.

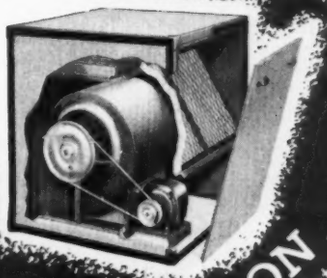
All this is offered you—an opportunity to be **THE** Warm Air Heating and Air Conditioning Dealer and authority in your community—provided only that the WEIR-MEYER franchise is still available when you apply.

Write to-day for full details—get out in front and be the leader, don't just wish you had!







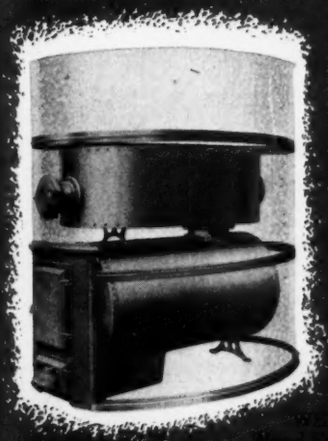


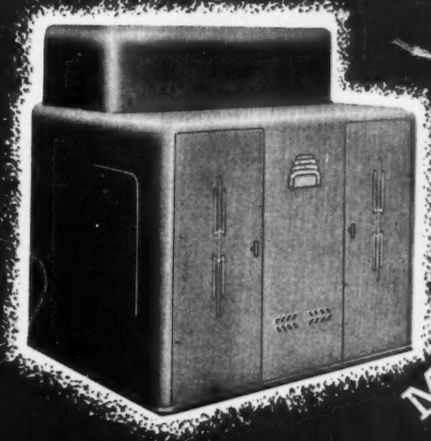
THE MEYER FURNACE COMPANY

Established 1866

PEORIA, ILLINOIS

ALWAYS THE INDUSTRY'S LEADERS





MAIL THE COUPON . . TO-DAY

Fill in or simply attach to your letter- or bill-head.

The Meyer Furnace Co.
Peoria, Illinois

Please send full details of the WEIR-MEYER proposition.

The Most Efficient Ventilator Ever Designed

The "Syphon Air"

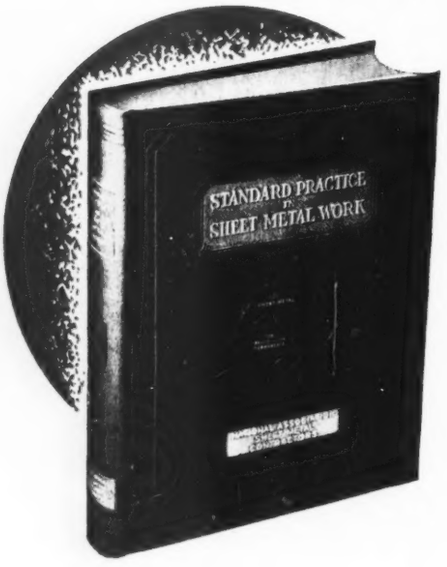
It's "just what the name implies"—the wind blows in at the back and out at the front and sucks or "syphons" the foul air, gases etc. out of the rooms below much faster than with any other ventilator of the same size.

Correctly designed for frictionless flow of air, and sturdily made of ARMCO INGOT iron to render care-free efficient operation for years. It rotates freely on a bronze ball bearing which will never rust and interfere with free motion.

This ventilator is so obviously BETTER AND MORE EFFICIENT that it helps you get business you could never get without it. Write for prices and full details as to sizes, air-removal, etc.

BE A BETTER SHEET METAL MAN!

OWN A COPY OF "STANDARD PRACTICE IN SHEET METAL WORK" AT THE SPECIAL PRICE OF $7.00 NET CASH



The regular price on this big 768-page book, crammed full of drawings, diagrams and practical instructions on how to meet and solve every sheet metal problem is $10.00, **and this special price of $7.00 is for a short time only.** Even the BEST sheet metal man can profit from this book which has been called "The 'Bible' of the Industry" and which is a compilation of modern shop practice as follows:

- SECTION I
  Roofing, Gutters, Conductors, Flashings and Corrugated Iron Work
- SECTION II
  Skylights and Ventilators
- SECTION III
  Metal Cornices
- SECTION IV
  Metal Ceilings
- SECTION V
  Warm Air Furnaces
- SECTION VI
  Heating and Ventilating Systems
- SECTION VII
  Blow Pipe and Exhaust Systems
- SECTION VIII
  Fire Doors and Kalamein Doors
- SECTION IX
  Hollow Metal Doors and Trim
- SECTION X
  Hollow Metal Windows
- SECTION XI
  Restaurant, Kitchen and Hotel Equipment
- SECTION XII
  Protective Coatings and Paints

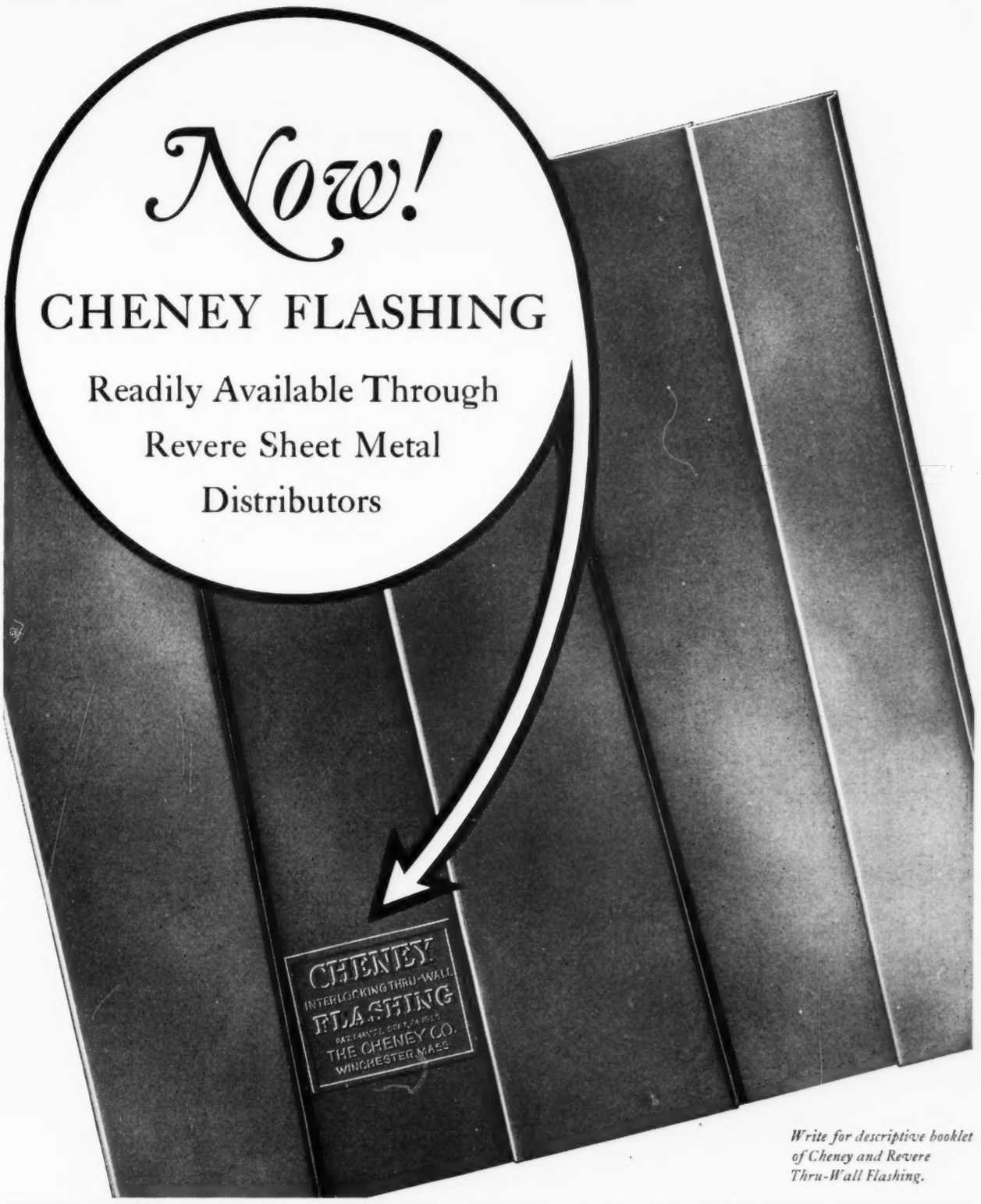
Every Man In Your Shop Will Learn From This Book. It Will Teach You Practical "Short Cuts" That Will Show You Extra Profits Worth Many Times The Price. Distributed By Sheet Metal Worker, 45 W. 45th St., New York City, or by Geo. Harms, 1313 S. Adams St., Peoria, Ill.

F. MEYER & BRO. CO., PEORIA, ILL.

Now!

CHENEY FLASHING

Readily Available Through
Revere Sheet Metal
Distributors



Write for descriptive booklet of Cheney and Revere Thru-Wall Flashing.

Revere Copper *and* Brass

FOUNDED BY PAUL REVERE 1801

INCORPORATED

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK CITY · MILLS: BALTIMORE, MD. · TAUNTON, MASS.
NEW BEDFORD, MASS. · ROME, N. Y. · DETROIT, MICH. · CHICAGO, ILL. · SALES OFFICES IN PRINCIPAL CITIES

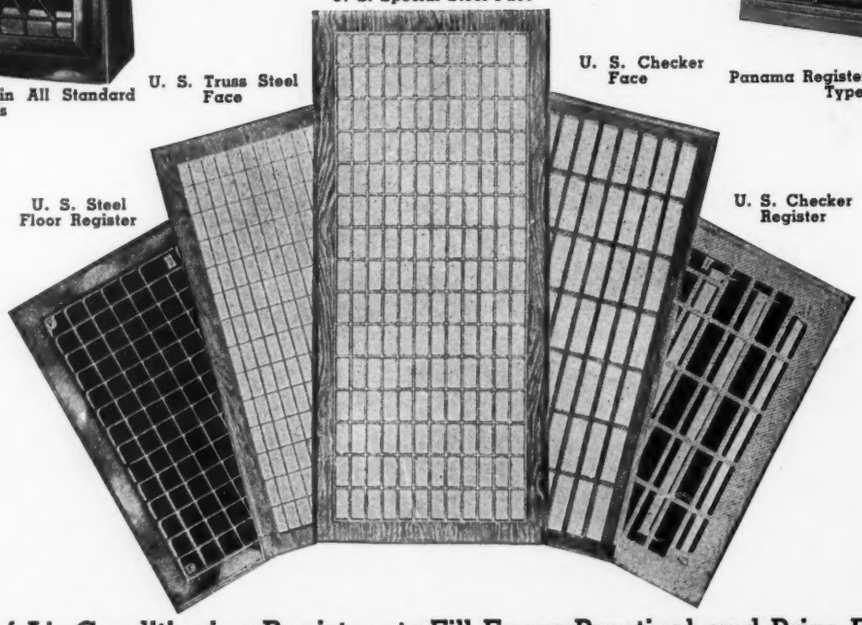
GET SET *for* 1936 *with the* FINEST COMPLETE LINES *of* GRAVITY *and* AIR CONDITIONING REGISTERS

U ANNOUNCES S

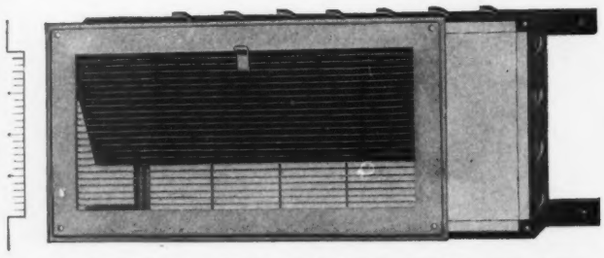
National Register in All Standard Sizes

A new complete line of the latest and most efficient styles of Air Conditioning Registers and Vent Faces, Straight-Flow and Down-Flow and Multi-Flow Types.

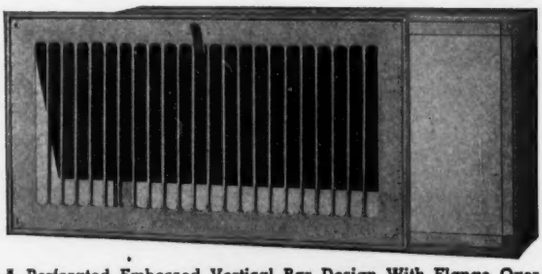
Panama Register. A Beautiful Bar-Type Design



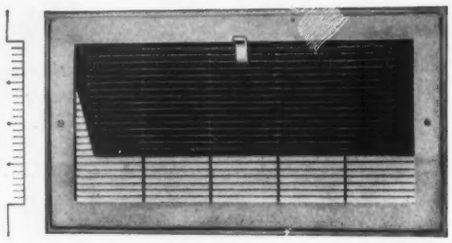
New Lines of Air Conditioning Registers to Fill Every Practical and Price Requirement



A Fin-Type Close-Bar Design With Plaster Clinching Stud Frame

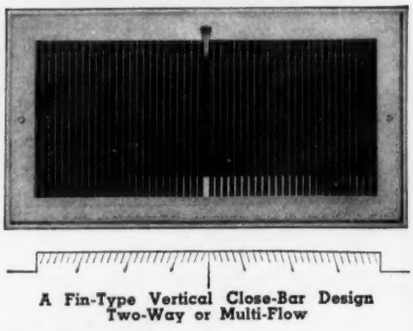


A Perforated Embossed Vertical Bar Design With Flange Over Baseboard Frame



One Piece Sidewall-Down-Flow With Band Steel Box Frame

Send for New Warm Air Register Pocket Manual No. 25 Showing and Listing Every Required Style of U. S. Air Conditioning Registers. Fin-Type and Perforated Designs for All Classes of Installations.

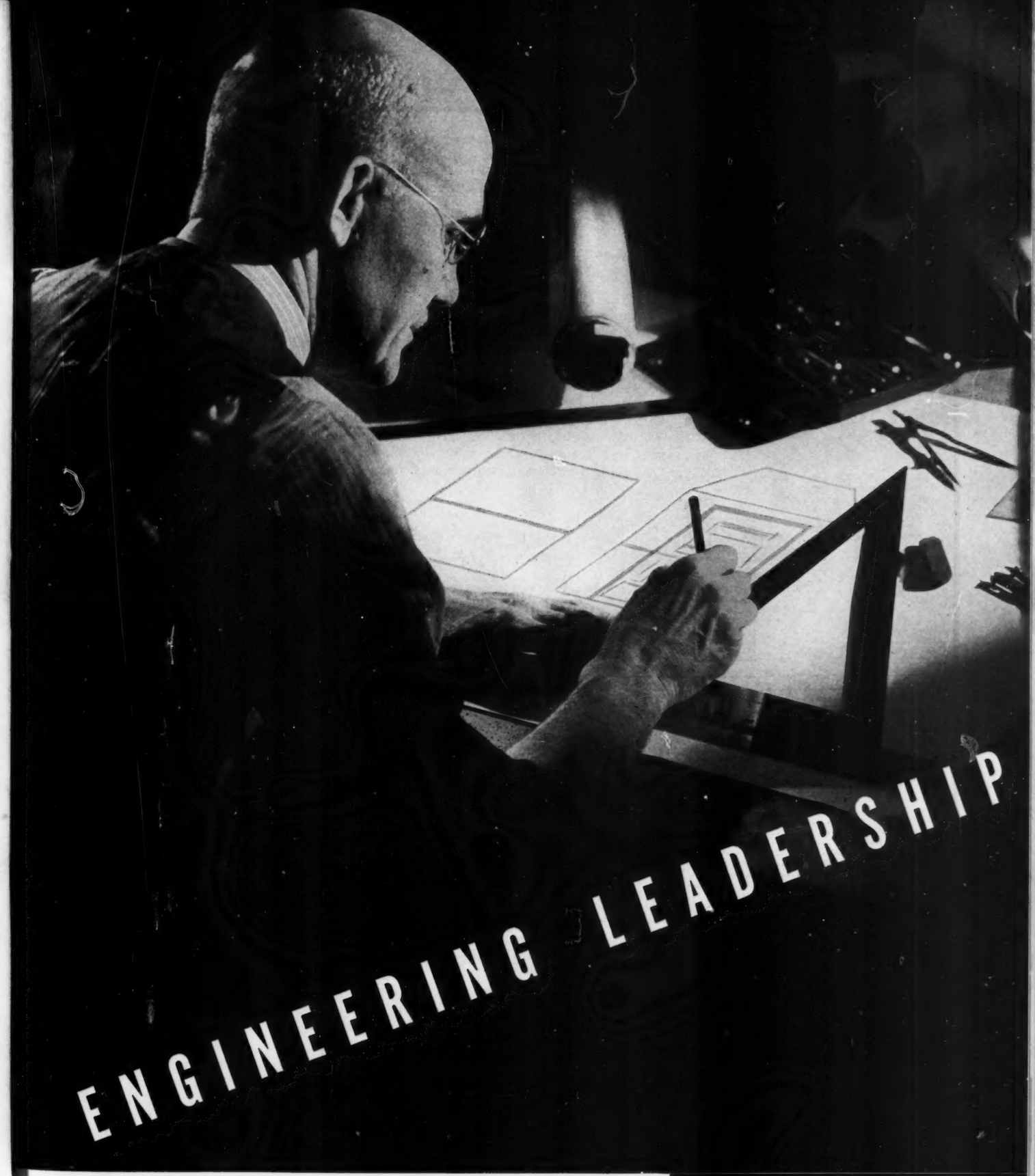


A Fin-Type Vertical Close-Bar Design Two-Way or Multi-Flow

UNITED STATES REGISTER CO.

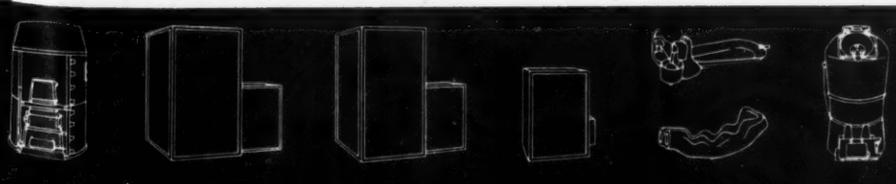
BATTLE CREEK, MICHIGAN, U. S. A.

Branches: Minneapolis, Minn., Kansas City, Mo., Albany, N. Y., San Francisco, Calif.



ENGINEERING LEADERSHIP made the first Rudy Furnace an immediate success. Through the years it has played a major part in the popularity of Rudy products. More important—it has enabled Rudy dealers to sell profitably against any competition.

THE RUDY FURNACE COMPANY... DOWAGIAC, MICHIGAN



RUDY
PRODUCTS

ALWAYS MENTIONED WHEN BETTER HEATING IS DISCUSSED

MELLOW WARM AIR FURNACE

A Heating Plant For Every Job

FRONT RANK HEATING SYSTEMS

Mellow Warm Air Furnace with square casing.

Here is a golden opportunity to make 1936 a profitable furnace year with a line that is complete. With the Liberty line, you can meet all competition and bid on all jobs regardless of size or type of installation. The line includes Mellow Cast Furnaces and Front Rank Steel Furnaces in sizes to meet all needs. Both are products of sound and practical engineering—both enjoy enviable reputations for long life and satisfactory performance. Plan now for 1936. Write for complete information, discounts and prices.

Mellow Warm Air Furnace without casting. Note sturdy all cast construction.

SPECIFICATIONS—MELLOW-WARM AIR GRAVITY TYPE

Number of Furnace		110	120	130	140	150	160
Diameter of Casing	Inches	36	40	44	48	52	56
Diameter of Fire Pot	Inches	18	20	22	24	26	28
Diameter of Grate	Inches	17	18¼	20	21	24	26
Height of Front Casting	Inches	50	50	52	52	52	59
Diameter of Smoke Pipe	Inches	8	8	8	9	9	9
Grate Surface	Inches	220	262	314	322	452	508
Shipping Weight with Casing	Pounds	815	925	1135	1345	1595	1925
Shipping Weight without Casing	Pounds	750	850	1050	1250	1500	1800
Heating Area	Sq. Inches	3321	4276	6130	7660	8961	10,064
Heating Capacity 1,000 Cu. Ft.		8-10	10-14	14-18	18-22	22-26	26-30
Capacity	Sq. Inches	346	422	495	609	791	889
Btu. Developed —7 lb. C. Rate		54,000	66,000	77,500	95,000	123,500	139,000

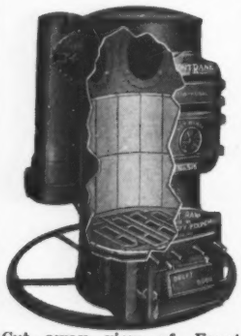
SPECIFICATIONS—MELLOW AIR CONDITIONERS—WARM AIR FORCED TYPE

Size		120	130	140	150	160
Width	Inches	58	60	64	66	70
Depth	Inches	36	40	44	46	50
Height	Inches	60	62	62	62	64
Wheel Size	Inches	10	12	12	14	16
Motor	H. P.	1/6	¼	¼	¼	1/3
Filters		2	3	3	4	4
C. F. M.—¼ S. P.		1000	1250	1500	1600	2400
R. P. M.		626	458	478	416	403
Btu.—Hand Fired		72,000	88,000	103,000	124,000	142,000
Btu.—Oil or Stoker		82,000	100,000	116,000	140,000	162,000

SPECIFICATIONS—FRONT RANK—WARM AIR GRAVITY TYPE

		Tubular Type Radiator								Crescent Type Radiator		
Number of Furnace		381	45XL	455	51XL	515	575	635	665	22A45	26A51	29A57
Diameter of Casing	Inches	38	45	45	51	51	57	63	66	45	51	57
Diameter of Drum	Inches	18	22	22	26	26	29	32	32	22	26	29
Stretch-out of Casing		9 ft. 11½"	11 ft. 9⅜"	11 ft. 9⅜"	13 ft. 4⅛"	13 ft. 4⅛"	14 ft. 11¼"	16 ft. 5⅜"	17 ft. 1⅜"	9 ft. 8"	11 ft. 3"	12 ft. 9½"
Width of Lower Casing	Inches	23	23	24	23	24	24	24	26	24	24	24
Width of Upper Casing	Inches	30	26	30	26	30	30	30	36	26	26	28
Height of Canopy, not less than	Inches	12	15	15	15	16	18	18	24	15	16	18
Height Cased, not less than ‡	Inches	68	67	72	67	73	75	75	89	68	68	70
Height, Fire Brick	Inches	21½	24	24	24	24	24	24	31	22	22	22
Height of Drum	Inches	58	52	58	53	59	62	62	69	52	52½	54½
Size Radiator Collar	Inches									8x8½	8x13½	10x13
Height of Radiator	Inches	37	29	34	29	35	38	38	42	34	34	36
Size of Radiator	Inches									7x31	9x40	11x44½
Diameter of Radiator	Inches	9	10	10	11	11	13	15	18			
Diameter of Smoke Pipe	Inches	8	9	9	9	9	10	10	10	9	9	10
Size of Feed Door Opening	Inches	10x12	8¾x12½	12¼x14	8¾x12½	12¼x14	12¼x14	12¼x14	12¼x14	10x12	10x14	10x14
Size of Ash Door Opening	Inches	8¼x11½	10x15½	10x15½	10x15½	10x15½	10x17	10x17	10x17	10x16	10x16	14x18
Heating Surface	Sq. Inches	6395	6671	7378	7763	8490	10258	11678	13877	6491	7940	2444
Rating	Sq. Inches	350	505	529	679	705	853	1015	1093	498	695	824
Btu. Developed—7 lb. C. Rate		54,000	85,000	91,200	124,000	140,600	164,800	202,000	219,000	77,700	108,400	128,500
Shipping Weight less Casing	Pounds	750	1000	1000	1200	1200	1450	1650	1800	1000	1223	1377

‡Lowest Part of Canopy must be at least 8 inches above Drum Head.



Cut-away view of *Front Rank* showing boiler plate and construction.

SPECIFICATIONS—FRONT RANK—DE LUXE—FORCED AIR TYPE

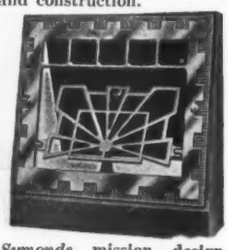
	Tubular Type Radiator					Crescent Type Radiator		
Size	455	515	575	635	665	22A45	26A51	29A57
Width Ins.	62	62	74	98	98	64	68	78
Depth Ins.	44	46	54	58	58	42	48	50
Height Ins.	66	68	70	70	76	64	64	66
Wheel Size Ins.	12	14	16	2-12	2-14	10	14	16
Motor H. P.	¼	¼	1/3	1/3	½	1/6	¼	1/3
Filters	3	4	4	5	8	2	4	4
C.F.M., ¼ S.P.	1250	1600	2400	3500	4800	1000	1600	2400
R. P. M.	458	416	403	502	472	626	416	403
Btu. Hand Fired	90,000	120,000	150,000	185,000	220,000	89,000	115,000	145,000
Btu. Oil or Stoker	105,000	135,000	170,000	205,000	245,000	102,000	130,000	165,000

All Mellow and Front Rank Furnaces can be adapted to oil or gas burners, automatic coal stokers, or can be hand fired. Humidity and temperature controls can be manual or entirely automatic.

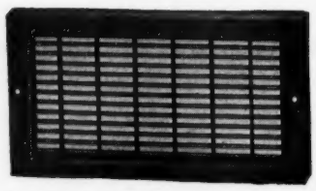
Front Rank DeLuxe Air Conditioner. The last word in modern heating plants.

SYMONDS REGISTER

We are now manufacturers of the famous line of Symonds Registers. The line is complete and includes baseboard and side wall registers, wrought steel floor registers, wrought steel faces and grilles, wrought steel cold air faces, ventilating registers, cord or chain operated registers, adjustable ceiling ventilators, clothes chute doors and sheet metal specialties. Write us for complete catalog, prices, etc.



Symonds mission design gravity register.



Symonds new forced-air type register.

LIBERTY FOUNDRY CO.

ST. LOUIS, MO.

TWO STEPS *in selling that* LEAD *to* JOBS *like these*

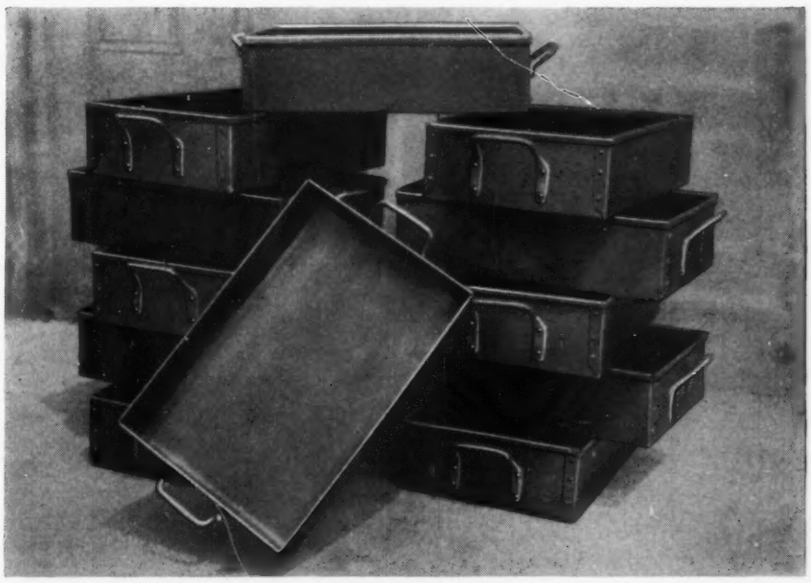
Be sure you take them both when you call on Chemical and Process Plants

THERE are two steps that lead to every Monel Metal job . . . and your biggest success comes when you take them both.

Your customer is interested in his own work and the way his present Monel Metal equipment helps him get it done. But you can often open his eyes to other uses for Monel Metal around his plant. Suggest them to him.

He is interested in making a connection with a contractor who can do a bang-up job of fabricating. Prove that you can turn out anything he wants, in a workmanlike manner.

Always remind any prospect you call on that Monel Metal is rust-proof, resistant to corrosion, and tough, strong and durable. For those reasons Monel Metal is widely used in chemical and processing plants for drying trays, trucks, containers, hoppers, chutes, table tops, utensils, ventilating hoods, fume ducts, measures, percolators, steam baths, oven linings, and sinks.



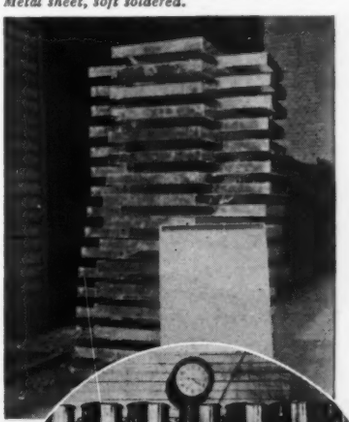
Heavy gauge Monel Metal pans used in chemical plants where resistance to corrosion and ability to withstand rough usage are of utmost importance. Joints made by riveting, using Monel Metal rivets. Built by Metal Products Corporation, Weehawken, New Jersey.

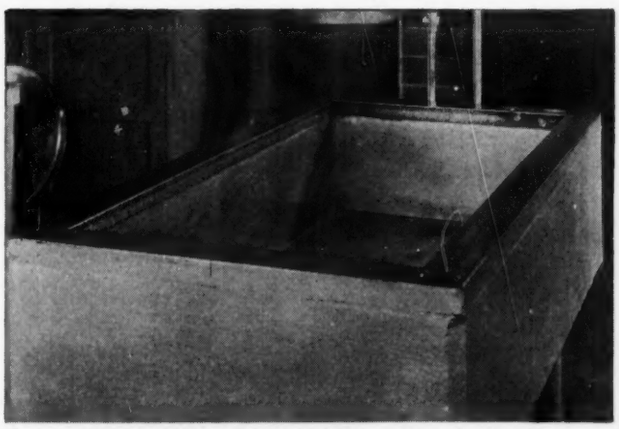
Write for working instructions and any other information you might need for going after this class of work. We will gladly help you.

• • •

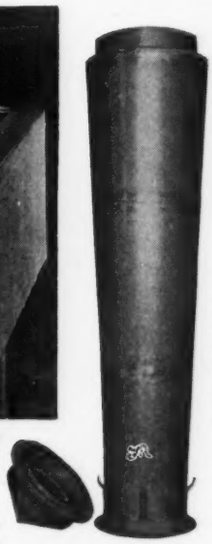
THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.

Monel Metal trays made by the Metal Products Corporation, Weehawken, New Jersey, for the handling of dye-stuffs. Made of 20 gauge Monel Metal sheet, soft soldered.

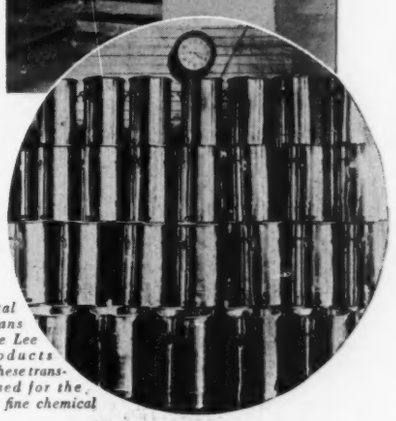




Concrete sink lined with Monel Metal sheet, lock seam silver soldered. This is one of a number of similar Monel Metal lined sinks used throughout a well-known pharmaceutical plant.



(At right) 16 gauge Monel Metal Percolator used by The Upjohn Company for the extraction of drugs from herbs. The percolator is 26" diameter by 95" high, gas welded throughout. Built by the Kalamazoo (Mich.) Sheet Metal Mfg. Co.



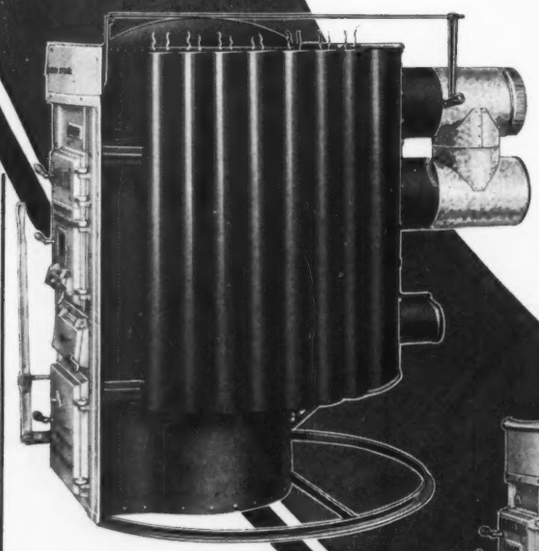
Monel Metal transfer cans made by the Lee Metal Products Company. These transfer cans used for the handling of fine chemical products.

MONEL METAL

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

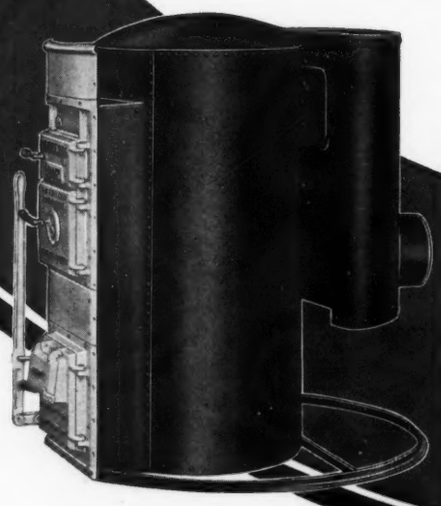
Of course they're –

Quality . . . salability . . . economy . . . everything desirable to dealer and customer is built into each one of the great variety of furnaces and air conditioning equipment offered by Peerless. Business is on the upswing . . . the list of new Peerless installations is growing larger every day . . . dealers are capitalizing on this line . . .



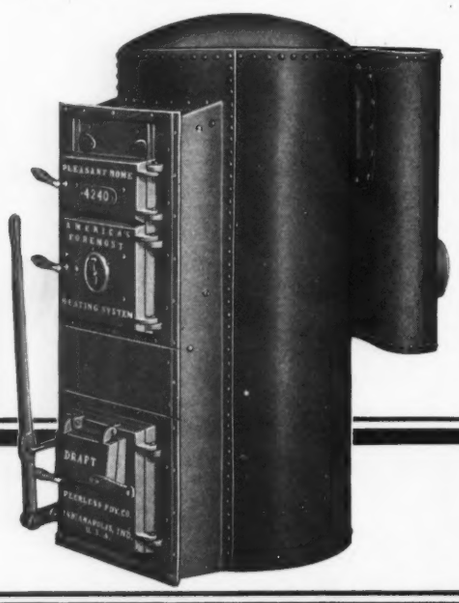
PEERLESS BOILER PLATE FURNACE WITH PRESSURE HEAT TUBES

Shoots the air to every room in the house! Fourteen pressure tubes force air to every corner at a speed 50% greater than ordinary furnaces. It means better heat and less fuel cost. Down draft combustion and automatic damper control are just two of the many outstanding features built into this great furnace.



PEERLESS 48-A SERIES STEEL FURNACE

With V-Baffle radiator. Exclusive hot blast construction, assuring perfect combustion. Draw-center rotating grates on case-hardened steel balls. Double-feed doors. Malleable iron handles that lock tight. Water coil ports for one-inch water coil above feed doors.



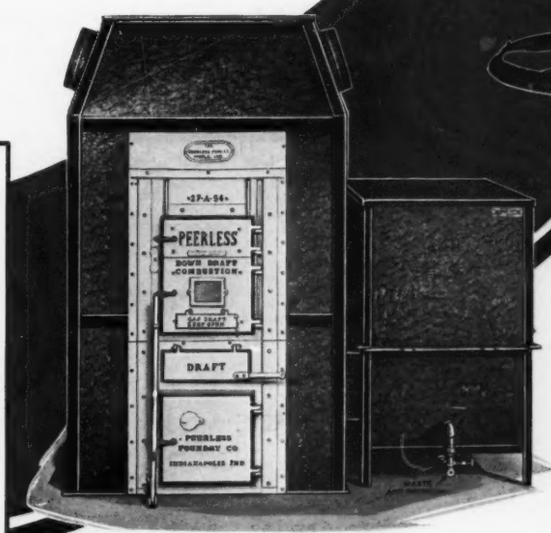
"PLEASANT HOME" RIVETED STEEL FURNACE

Riveted and caulked assuring a gas-tight and smoke-tight furnace. Highest quality construction allowing you to guarantee it against any defect or heating fault when properly installed. A superior firepot built to withstand a 3300° fire test. Draw-center ball bearing grates. Exclusive hot blast construction. Two feed doors. Ample hot water supply. Adaptable to gas or oil fire. A sure leader in its field.

PEERLESS

PEERLESS !

They have our complete co-operation in sales development and credit extension . . . for all Peerless Products can be purchased on convenient credit terms with three years to pay at low interest rates. Look over the Peerless line and send for complete literature at once . . . and remember, we do not sell to or solicit mail order houses.



PEERLESS AIR CONDITIONING UNITS

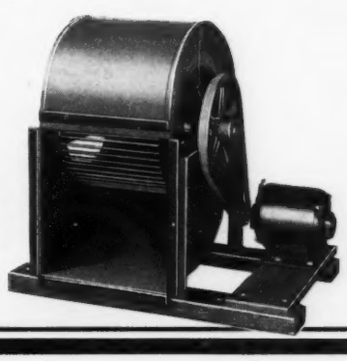
Completely engineered and built by Peerless. Not just another assembled unit. Furnace, blower and all additional equipment manufactured by Peerless into one balanced unit. Each different type unit has been "home tested" to determine performance, efficiency, cleanliness, humidity and economy. They assure correct temperature the year 'round, clean air to breathe and the right humidity, at a minimum of cost and bother.

PEERLESS CAST IRON FURNACE

Positively the last word in cast iron furnaces embodying such features as: one piece radiator, heavy corrugated combustion dome, heavy ribbed firebowl, duplex grate, slip-over front, surface ground doors, upright shaker handle, detachable hinge bracket.

PEERLESS CLEANAIRE

Compact, efficient, and easy to install. Three-section mineral filter removes all dirt and impurities. Assures clean, even, positive air circulation in entire house. Extremely quiet. Built-in motor and precision blower wheel.

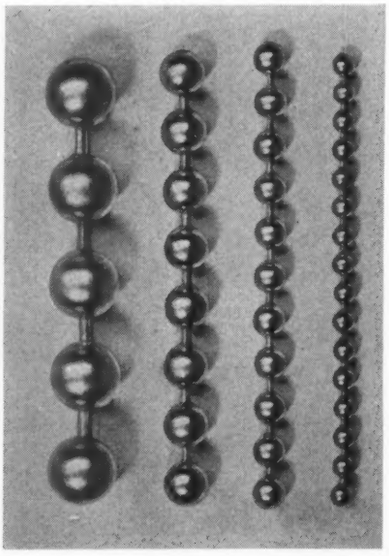


PEERLESS BLOWERS

As quiet as the quietest electric refrigerator, but a powerful air circulating agent. A Peerless blower removes the worry and discomfort of cold spots in the house. Its efficient, trouble-free operation forces heat to every corner.

FOUNDRY CO. INDIANAPOLIS INDIANA

BEAD CHAIN*



No. 20 BEAD CHAIN — No. 13 BEAD CHAIN — No. 10 BEAD CHAIN — No. 6 BEAD CHAIN

Illustrations Actual Size
Samples on Request

Size No.	Dia. of Bead in Inches	Approx. Tensile Strength in pounds
6	.125	25-30
10	.187	45-50
13	.250	85-100
20	.375	175-200

MATERIALS

Brass, Bronze, Gilding Metal, Nickel Silver, Aluminum; Chromium, Nickel, Gold and Silver Plate. Standard attachments as shown, or made to customers' specifications.

• • •

NEW CHAIN AND CORD COUPLING

This new coupling, No. 10-V, makes a firm connection between BEAD CHAIN and Venetian blind cord. It is easily applied. For No. 10 BEAD CHAIN only.

*Trade Mark Reg. U. S. Pat. Off.

The non-kinking and swiveling characteristics of BEAD CHAIN* make it advantageous for use in regulator adjustments.

BEAD CHAIN* adds but little to the cost of any heating or ventilating unit and greatly improves the appearance and operation of the finished job.

BEAD CHAIN* is adapted to sprockets that have been designed for the automatic regulation of dampers and ventilators, that work smoothly and efficiently.

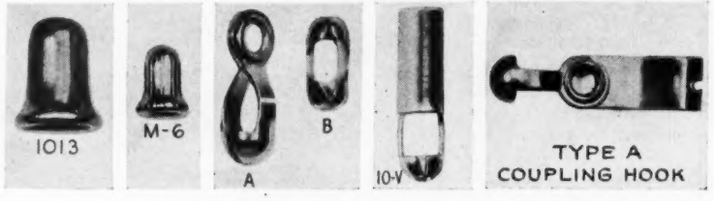
BEAD CHAIN* may be had in bulk and cut lengths, with couplings and attachments, or in assemblies to meet the specifications of the manufacturer.

BEAD CHAIN* engineering service is prepared to co-operate fully with manufacturers in the design of assemblies where the use of chain is necessary or desirable.

DETACHABLE PENDANTS

NON-DETACHABLE PENDANTS

COUPLINGS



BEAD CHAIN

Trade Mark Reg. U. S. Pat. Off.

THE BEAD CHAIN MANUFACTURING CO.
BRIDGEPORT **CONNECTICUT**

H&C Better Registers For EVERY Type of Installation!

New Mesh
$\frac{7}{16}$" x 1$\frac{7}{16}$"

The NEW H & C No. 210 Floor Register

A supremely well-built floor register of the grid type. Flush intersections and invisible corner joints make for better appearance. Now offered with openings that measure only 7/16" wide, providing better walking surface and eliminating the possibility of heels catching in the mesh. Face is removable from body. Popular in medium dark oak finish. Costs no more than ordinary floor registers.

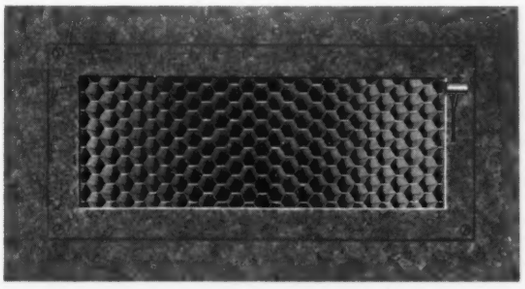
LONG recognized as the No. 1 register line of America, not only by virtue of its completeness but also because of the attractive design, sound construction and all around quality of its products, the H & C line more than ever before merits your serious consideration.

H & C engineering has kept H & C registers well in the lead of progress. For every conceivable type of installation the H & C line offers an ideal register; for every taste an attractive design is available. That's why alert contractors and leading jobbers, the country over, have standardized on H & C!

HART & COOLEY MANUFACTURING CO.

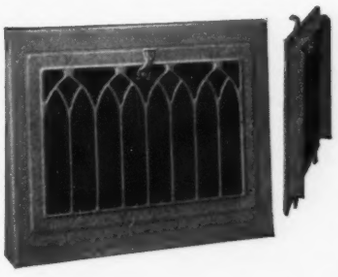
Warm Air Registers · Regulator Sets · H&C · Air Conditioning Grilles · Dampers · Chain

61 W. KINZIE ST. · CHICAGO · ILLINOIS



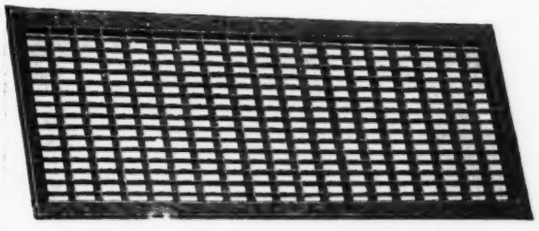
The NEW H & C No. 90 Design Directional Forced Air Register

One of a very complete high class line of Air Conditioning registers. May be installed flush with the plaster. Directs air exactly as desired. Eliminates cold spots and stratification. Minimum resistance—no turbulence.



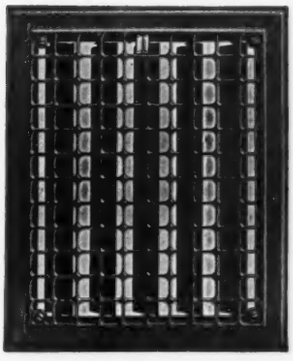
H & C No. 120 Baseboard Register

This register constructed to be installed with the stackhead over-lapping the frame, incorporates the same pleasingly attractive face design that made the H & C No. 110 the most popular Baseboard Register ever built.



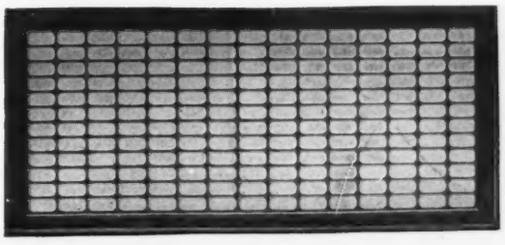
No. 265 Cold Air Face

Matches in appearance the H & C No. 210 Floor Register. Mesh openings are 11/16" x 1-7/16". A very sturdy grid type Cold Air Face possessing large air capacity. Careful, finished workmanship and superior construction are evidenced in every detail.



No. 255 Cold Air Face

The pinched back fretwork of this cold air face provides it with greater air capacity than any other pressed steel cold air face. Strongly braced.



H & C No. 200 Floor Register

A favorite of long standing, the H & C No. 200 continues to be the finest floor register of the pressed steel type on the market today. No other of equal size can match it for air capacity.

FOR LASTING ECONOMY SUGGEST COPPER . . .

•HUSSEY

Copper installations have proved that they are the most economical in the long run. Copper is the quality metal on any job. Your suggesting it, your customer using it will result in a booster of your judgment and business ability. Copper installations carry a better profit . . . another good reason why extra sales effort should be exerted to secure this type of business. Now, with the definite upswing in business and with the buyer seeking better quality rather than price, is the time to line up with copper and Hussey. Hussey Service and extensive line enable you to serve your customers quickly and economically. Following are some of the many Hussey Copper Products:

HUSSEY COPPER PRODUCTS—SHEET COPPER

Corrugated Round Copper Conductor Pipe—Sizes 2 in. to 6 in. 10 ft. Lengths.

Corrugated Square Copper Conductor Pipe—Sizes 2 in. to 5 in. 10 ft. Lengths.

Plain Round Copper Conductor Pipe—Sizes 2 in. to 6 in. 10 ft. Lengths.

Copper Straps—For square pipe only. 2 in. to 5 in.

Copper Eaves Trough—Single Bead, Lap Joint; Double Bead, Lap Joint; Single Bead, Slip Joint; Double Bead, Slip Joint. Sizes 3 in. to 10 in. 16 oz. 10 ft. Lengths.

Copper Gutter Ends, Caps and Outlets—all sizes.

Copper Roof Gutter—All sizes. All Shapes. All weights.

Copper Roof Ridging—Sizes 7 in. to 14 in. 10 ft. Lengths.

Copper Eaves Trough Mitres—Inside Corner; outside corner. Single Bead, Lap Joint; Double Bead, Lap Joint; Single Bead, Slip Joint; Double Bead, Slip Joint. Sizes 3 in. to 7 in.

Corrugated Copper Round Expanding Elbows and Shoes—30°; 45°; 60°; 75°; 90°. 16 oz. Sizes 2 in. to 6 in.

Corrugated Copper Square Expanding Elbows and Shoes—45°; 60°; 75°; 90°. 16 oz. Sizes 2 in. to 5 in.

Plain Round Copper Elbows and Shoes—30°; 45°; 60°; 75°; 90°. 16 oz. Sizes 2 in. to 6 in.

Copper Cut-Offs—Plain Round. Sizes 2 in. to 6 in. Square Corrugated. Sizes 2 in. to 5 in. Round Corrugated, sizes 2 in. to 6 in.

Copper Wire Conductor Strainers—Round and Rectangular. Sizes 2 in. to 6 in.

Copper Conductor Heads—To fit Round or Square Pipe.

Gutter Hangers—Adjustable Bronze or Copper. Also Copper Strap Hangers. All standard sizes.

Copper Conductor Pipe Hooks—Corrugated Round Hinged Hooks, (Wood Drive) Sizes 2 in. to 6 in. (Brick Drive) Sizes 2 in. to 6 in. Plain Round Hinged Hooks (Wood Drive) Sizes 2 in. to 4 in. (Brick Drive) Sizes 2 in. to 6 in.

Copper Conductor Pipe Sickle Hooks—Corrugated, sizes 2 in. to 4 in. Plain, sizes 2 in. to 6 in. Square Wired, sizes 2 in. to 5 in. For Wood and Brick.

Cast Bronze Pipe Fasteners—For Brick, Stone and Wood. All sizes.

Copper Strap Hangers—Sizes 4 in. to 6 in.

Copper Shingles—Various weights. 16 oz. recommended. 133 Shingles to the Square.

Soldering Coppers—Bottom, Roofing, Hatchet and Pointed. Also special styles to specifications.

Copper Rivets—Flat Head Copper Tinner's Rivets. Brazier Rivets. Round, Flat, Oval Head or Special Rivets.

Copper Wire Nails—Regular and Slating. Special styles made to specifications.

Detailed information on any item listed will be furnished upon request.

C. G. HUSSEY & COMPANY, Pittsburgh, Pa.

WAREHOUSES

CHICAGO
CINCINNATI
CLEVELAND
NEW YORK
PHILADELPHIA
PITTSBURGH
ST. LOUIS

EXECUTIVE OFFICES AND MILLS
PITTSBURGH, PENNSYLVANIA

DISTRICT SALES OFFICES

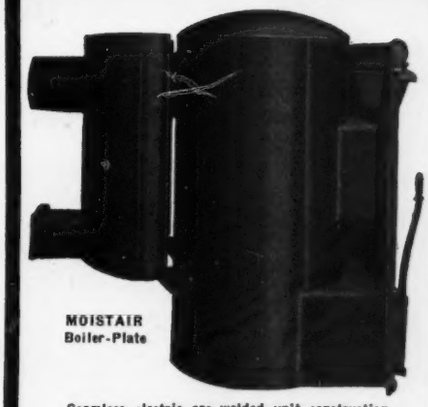
BALTIMORE
BUFFALO
CHICAGO
CINCINNATI
CLEVELAND
DALLAS
NASHVILLE
NEW ORLEANS
NEW YORK
PHILADELPHIA
PITTSBURGH
ST. LOUIS
SAN FRANCISCO

Always Dependable ROUND OAK

OFFERS THE FINEST COMPLETE LINE OF STEEL AND CAST FURNACES FOR SOLID AND LIQUID FUELS .. Also Air Conditioners

MOISTAIR
Blended-Iron

Patented diamond shaped radiator, specially designed water pan, patented rod construction, milled feed and ash pit doors.

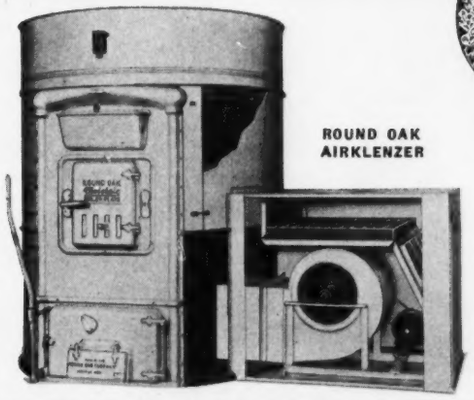


MOISTAIR
Boiler-Plate

Seamless electric arc welded unit construction, permanently leak-proof.

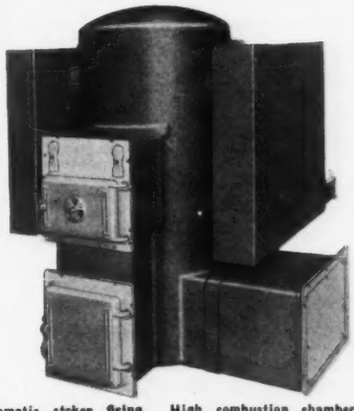
OIL MASTER

Arc - welded copper alloy Gas - Tight. Highly efficient. Adapted for gas with a conversion burner as well as oil firing.



ROUND OAK AIRKLENZER

View of coal fired air conditioning unit. Airklenzer available with either cast or steel furnaces.



COAL MASTER

For automatic stoker firing. High combustion chamber, triple radiators, special clinker chute and receptacle.

During this better business year ROUND OAK offers their dealers:

1. Highest quality at moderate price.
2. Engineering service.
3. Sales and advertising helps.
4. Finance Plan.
5. Good delivery service.
6. A trade name favorably known from coast to coast.

DISTRIBUTORS:

Sioux Falls Corrugating Co., Sioux Falls, S. D.
Haw Hardware Company, Ottumwa, Iowa
Wm. M. Dutton & Sons Co., Hastings, Nebr.
Waterloo Metal and Mfg. Co., Waterloo, Iowa
The MacIntyre Company, Fond du Lac, Wisconsin
Sam H. Kimbler, Denver, Colo.

ROUND OAK COMPANY Dowagiac, Mich.
STOVES RANGES FURNACES AIR CONDITIONERS Since 1871

AIRE-FLO Air Conditioner for oil with enclosure for burner. Made in four sizes. Note beautiful cabinets.

THE BIGGEST NAME AND RESIDENCE

Forty years ago Lennox started pioneering steel furnaces. Today they are building over half of all the steel furnaces made in the world.

Then came forced air heating and air conditioning which requires a pressure tight furnace. Again Lennox pioneered with its nationally known Aire-Flo equipment and today Lennox is the largest in the residence air conditioning field.

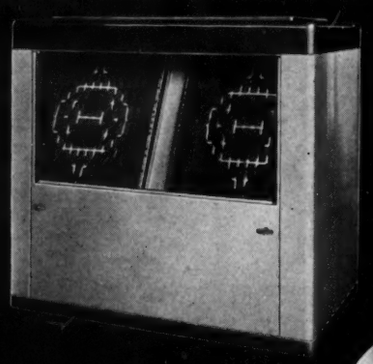
These pages picture only a few of the many products that put Lennox dealers out ahead of all other competition. For progress and profits a heating contractor must have a complete line. Lennox has it.

JOIN THE LEADERS FOR

Write To Us For

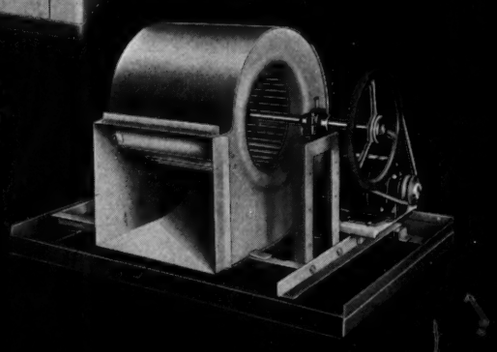
THE LENNOX FURNACE CO., Inc.

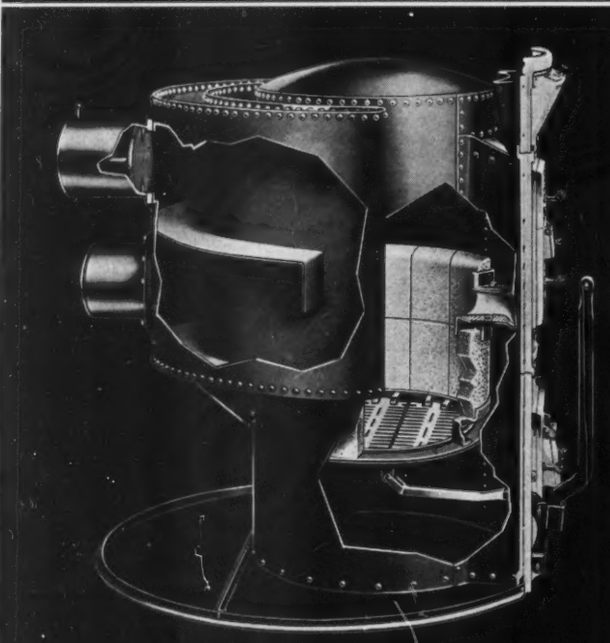
AIRE-FLO for coal, shown here with air washer which can be added to any De Luxe Aire-Flo.



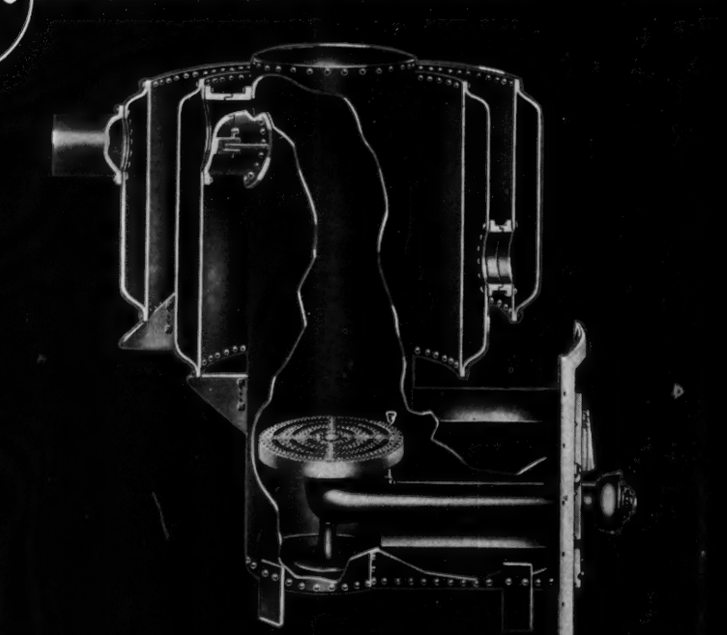
AIRE-FLO Filter-Blowers for separate installation. 10" to 21" double width sizes. Small sizes are priced with the lowest but all are of fine cabinet construction using furniture steel.

AIRE-FLO Blowers are the quietest of any made today. Rubber mounts and felt connections isolate all vibration.





ORRID ZONE . . . H. C. Model for hard coal and coke. Six sizes with horseshoe radiator and long gas travel.



LENNOX GAS FURNACES are patented. Double radiators account for efficiency. Made in gravity and Aire-Flo.

IN STEEL FURNACES AIR-CONDITIONING

RIVETED STEEL—Through all the years Lennox has insisted upon the safety and tightness and durability of riveted seams in their steel furnaces. Experience has proved that this is the only steel furnace seam that stands the test of time—especially the alternate expansion and contraction that prevails in automatically fired jobs.

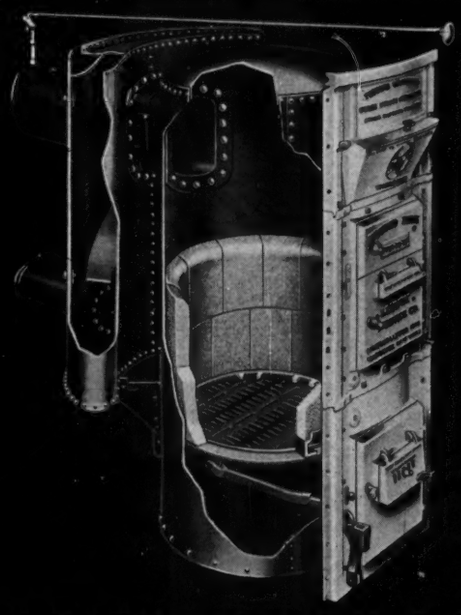
FINE CABINETS—Lennox was the first furnace manufacturer to install machinery for making furniture type steel cabinets for Air Conditioners. Even today these cabinets stand out as the finest looking, most correct and most easily installed of any on the market. Again Lennox pioneered.

PROGRESS AND PROFIT

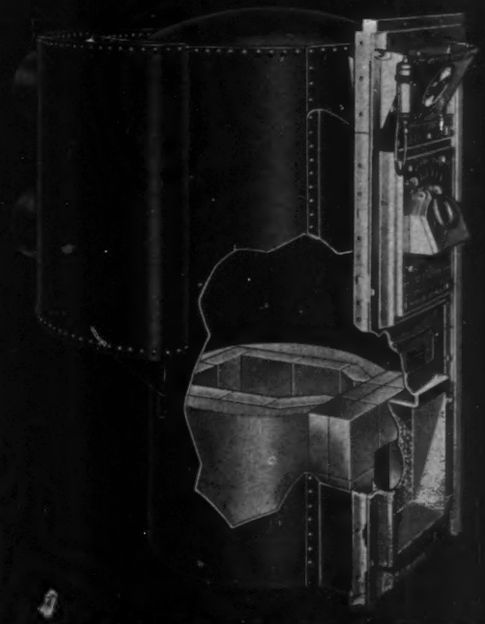
Full Information

Marshalltown, Iowa · Syracuse, New York

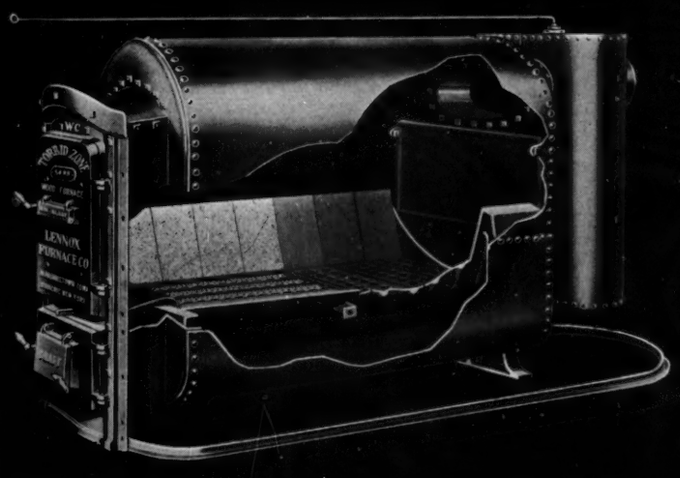
HERCULES SS-800 for loads from 500,000 to 1,000,000 B.T.U. The finest heavy duty forced air furnace made.



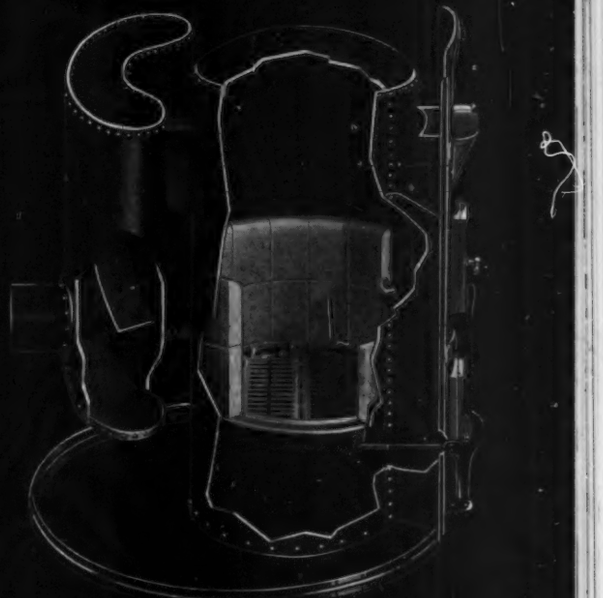
The TORRID ZONE has set the standard for all other steel furnaces. Made in nine sizes for all fuels.



TORRID ZONE OILFYRE for oil exclusively. Abundant surfa and long gas travel produce low stack temperature.



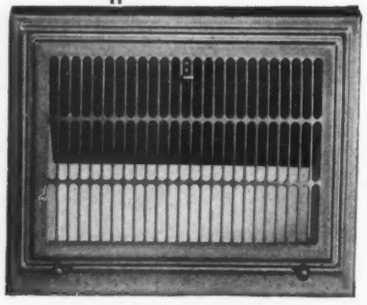
WOOD FURNACES and combination wood and coal burners are ideal for rural districts. Three sizes.



The EQUATOR is a rugged riveted steel furnace at cast iron furnace prices. Look into it.

AUER REGISTERS

In Auer's line there is a register for every purpose in gravity and forced air work. The two illustrated have proved their popularity in the air conditioning field . . . have given satisfaction to customers . . . have made handsome profits for contractors and dealers. Other Auer registers have their specific applications, and it will pay to check with Auer on your register requirements for every job.



ELITE MODEL

This Baseboard Model, since its introduction a year ago, has proved itself to be our most popular Baseboard Register. Its pleasing design is a real decorative asset in itself and it conceals the register box interior. Yet it answers the requirement of maximum free area since its slender bars offer no obstruction to the free flow of air.

CLASSIC MODEL

Auer Air Conditioning Registers are the result of years of experimenting and perfecting. While the design shown is the most popular because of its adaptability to fit in most decorative schemes, they are also made in other designs.

The rattle-proof and rigid construction of the valves in Auer Air Conditioning Registers are features that should not be overlooked.

For Air Conditioning

Write for new catalogue of gravity and forced air registers

The AUER REGISTER CO.

3608 PAYNE AVENUE :: CLEVELAND, OHIO

LOOKING AHEAD

Home-owners are looking ahead! They're examining, analyzing, criticizing their heating equipment—now while Winter is putting it to the test. At the first blush of Spring they'll be in a listening mood when you talk to them about improvements.

R. & B. is looking ahead, too! Getting ready for a big Spring drive . . . to take advantage of the biggest sales season in years. For months R. & B. engineers have been at work over their designing boards, R. & B. plants are in production on many improved lines, and the entire R. & B. organization is preparing for next season.

It's up to you to look ahead, too. Take advantage of the slack period to make a list of the most promising prospects you can find . . . and let R. & B. help make them *customers* this year.

RICHARDSON and BOYNTON Co.

244 MADISON AVENUE NEW YORK CITY

Branch Offices in Principal Cities

For Your Protection!

and your customers' satisfaction—

recommend and install only the genuine

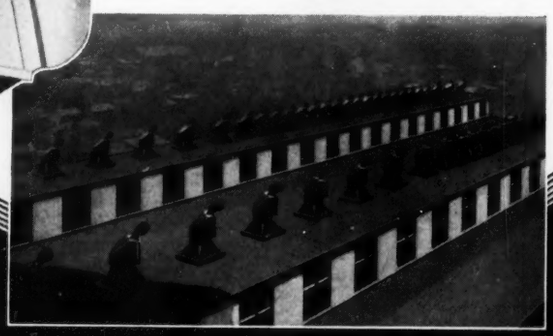
SWARTWOUT ROTARY
BALL BEARING
VENTILATOR

It's the ventilator with twenty-six years of unsurpassed service and satisfaction back of it—the ORIGINAL Rotary Ventilator. In making it "Standard" for your jobs you assure your customers higher efficiency per square foot of opening—more actual ventilation per dollar invested—longer life—less maintenance—greater value for their investment—which results in

MORE GOODWILL AND FUTURE JOBS FOR YOU

Write for complete data. We protect you on price. You protect your customer on quality.

THE SWARTWOUT COMPANY
18615 Euclid Avenue
Cleveland, Ohio



Swartwout

ROTARY BRONZE BALL BEARING

Ventilators

MORE ACTUAL VENTILATION PER DOLLAR INVESTED

NIAGARA

1936 AND FORWARD

How many new home heating jobs in your community were warm air during 1935? Nearly all, were they not? . . . And the future of warm air systems is bound to go on expanding even more rapidly.

Most welcome is the confidence which has been displayed in *Niagara* Warm Air Furnaces and Air Conditioning Units by established dealers. We like to regard this as an endorsement of *Niagara* engineering and *Niagara* policies. *Niagara* heating systems are the expression of 42 years' progressive acquaintance with residence heating requirements. The *Niagara* will continue to be known as the "dealer's furnace".

You, as a *Niagara* dealer, have a complete line—cast and steel furnaces in both gravity and air conditioning types, and the advanced *Niagara* Gas-fired series. So equipped, you may well expect 1936 to be the most prosperous of recent years. *Niagara* will cooperate toward this end with modern residence systems and with policies centered in dealer profit.

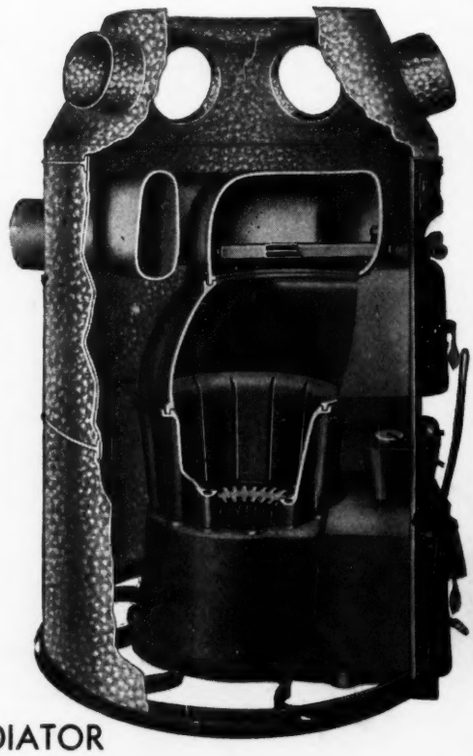
THE FOREST CITY FOUNDRIES COMPANY
2500 WEST 27th STREET
Cleveland, Ohio

NIAGARA *WARM AIR FURNACES AND AIR CONDITIONING UNITS*

WISE PEOPLE BUY WISE FURNACES LESS FUEL - MORE HEAT

WHO . . .

are the furnace dealers who look forward to another profitable year? Who are the dealers whose installations have made friends of their customers? Who are the dealers who can put on an aggressive sales campaign with full confidence that they are offering a furnace which will satisfy every demand for efficiency, economy, long life, beauty and dependability? Who are the dealers who have the following advanced engineering and construction features to help them close profitable sales?



FEATURES

- **NEW ONE PIECE SELF CLEANING RADIATOR**
  Flues open into the combustion chamber . . . radiator does not fill up with dirt and soot . . . provides larger combustion chamber and more prime heating surface.
- **NEW ASHPIT AND LOWER FRONT**
  Cast in one piece it eliminates the joint between ashpit and front. Makes installation very simple and assures perfect alignment of fronts.
- **ONE-PIECE CELLULAR FIREPOT**
  Air cell firepot, which University tests have proven to be at least 9% more efficient than the solid type.
- **DOMESTIC HOT WATER**
  Provision is made for a cast iron water heater designed to fit into top feed section. This new feature is available at a slight additional cost.

WISE DEALERS OF COURSE ! ! !

1936 will be a big heating year, and if the business we have enjoyed since the introduction of the new Series A Wise warm air furnaces only five short months ago is any indication of how they will sell during the coming year, we suggest that you not miss a good bet and at least investigate their possibilities in your territory.

A letter will bring you complete information on our exclusive dealer franchise plan, the Wise Series A, and our liberal extension of credit. Write at once.

WISE FURNACE CO., AKRON, OHIO.

AMERICAN ARTISAN

Volume 105 Number 1

As the Public Thinks—

A Forecast for 1936

1935 has been, all in all, a good year for our industry.

It has also been an interesting year to watch as ideas, plans, schemes (little more than nebulous in 1934) became public thinking and common public conversation in 1935.

What causes and effects of 1935 can we use as a basis for determining what to expect in 1936?

It is our belief that for our own particular industry the common indexes upon which business forecasting is based are not as important as are some less decisive and harder-to-judge factors which will be enumerated here.

In our judgment the basic factor which makes for good or bad business in our industry is public thinking.

To separate those public thoughts which affect our business it is necessary to view the entire kaleidescope of national activity because many of these factors are not self evident. Take for example the matter of national income. Probably most of us view national income in terms of how much money we, individually, made or had to spend. Actually, however, national income must be judged in terms of mass income because our industry cannot have good times until the public has money to spend.

Whether purchasing power increases as a result of more employment or employment increases as a result of higher income is like the chicken and the egg. We do know, however, that national income is going up, but is still below the so-called normal. The Department of Commerce gives the following figures:

1929	$79 billion
1930	73 billion
1931	61 billion
1932	48 billion
1933	44 billion
1934	49 billion
1935...(estimated)	53 billion

Equally interesting is the fact that in 1935 (based on 1934 figures) labor received about 67 per cent of all moneys paid out—the largest percentage since 1929. In 1934 property income (dividends and interest) accounted for 14 per cent of the total income. Rents and royalties accounted for 2 per cent. The earnings of professional persons and business men equalled 17 per cent of all incomes. According to all calculations about the same distribution will hold good for 1935.

The conclusions to be drawn from these figures, we think, are that incomes are going up, permitting people to buy more things and that the percentage of income going to those classes who spend practically as fast as they receive is higher than at any time since boom days.

Income Distribution

Interesting, but oftentimes deceptive, figures have been released on the grouping of income. Deceptive because in spite of the fact that a tremendously large portion of our wage earners are known to receive less than $1,500 a year we must not overlook the fact the automobile, radio and other "luxury" products manufacturers are selling new units almost as fast as they can produce them.

Income for 1933 (the last year for which figures are complete) show:

	Pct.
No income	3.1
$1 to $499	20.9
$500 to $999	21.8
$1,000 to $1,499	19.5
$1,500 to $1,999	14.2
$2,000 to $2,999	12.1
$3,000 to $4,999	6.3
$5,000 to $6,999	1.3
$7,000 and over	0.8
Total	100.0

Before we attempt to draw any conclusions from these income figures let us consider for a moment a parallel group of figures—those showing just what part of a wage earner's income goes for current needs. These figures, compiled by the Bureau of Labor Statistics for 1934, show this picture:

No. of persons per family	4.3
Total current expenditures	$1,593

Distribution of expenditures:

	Pct.
Food	36.8
Clothing	12.7
Housing	12.1
Household operation...	12.1
Furnishings and equip.	4.7
Transportation	6.6
Personal care	1.9
Medical care	3.4
Recreation	5.3
Formal education	.4
Vocation	.6
Community welfare	1.9
Gifts	1.0
Other expenditures	.5
Total	100.0

Briefly, it would seem as though these two tables indicate that 80 per cent of all families in this country earn less than $2,000 a year and that food, clothing, housing and household operation take about 75 per cent of all family income. They well may mean that the average family makes an income which does not allow large dollar expenditures except by the payment method and that only a quarter of the wage earner's income is available to buy the thousands of things we all want for enjoyment, pleasure, leisure, etc.

It means that the cost of every heating plant, roof, gutter, metal sink, air conditioning system we plan to sell probably comes out of 25 per cent of this $2.000 income or, if we include the 12 per cent household operating item, out of the 37 per cent of $2,000 income. Our domestic contracts come out of $750 a year. When we realize how many hundreds, perhaps thousands, of other businesses or products are also trying to get a share of that $750 a year we can appreciate the need for tuning our services to the thinking of the mass of earners.

There is, naturally, another side to this picture. Much of our work is sold to the man making more than $2,000 a year. Particularly air conditioning systems, expensive roofs, better types of drainage work, etc. We should know *how much* of our better class of work is bought by the larger-than-$2,000-income owner and what services of ours this type of owner is thinking about.

Unfortunately, decisive figures are not available. We have scattered figures, but general conclusions cannot be drawn from them. For example, a well known publication reaching the better owner reports a survey which indicated that their readers who expect to buy or build will desire a house

averaging 8 rooms as compared with 9 rooms now used. Four per cent will build over 15 rooms; fifty-eight per cent will build 8 to 15 rooms; thirty-eight per cent will build under 8 rooms. Forty-eight per cent will spend from $7,500 to $15,000. Twenty-eight per cent will spend under $7,500. Twenty-four per cent will spend from $15,000 to $40,000.

Equally interesting in this survey—thirty-nine per cent prefer warm air; forty-one per cent prefer hot water; thirteen per cent prefer steam; ten per cent prefer vacuum vapor.

Regardless of what percentage of any contractor's prospects or customers fall within these higher income brackets it is certain that this type of buyer is thinking in terms of quality products and quality services we can render. We should set our program accordingly.

Promotion

It would seem from the experiences of the last few years that our industry must do everything to focus public thinking on home building, improvement, remodeling, modernization. To our efforts should be added those of every manufacturer, association, organization engaged in this field. What is being done?

The most constructive answer is the program of the Federal Government.

Most of us know what government has done in the last two years to help the construction industry. The efforts have been widely planned and aggressively directed. F. H. A., H. O. L. C., Housing Division of P. W. A., Bureau of Agriculture Engineering of the Department of Agriculture, Federal Home Loan Bank System, Federal Savings and Loan Associations, Federal Savings and Loan Insurance Corporation, Federal Land Banks, Federal Farm Mortgage Corporation, and several dozen other agencies, broad in activity or specifically set up to do one certain job, are now in operation. If any contractor does not know how these new governmental agencies operate, what they are supposed to do, how they can aid all of us, he should make it a point to study these significant new agencies.

It should be pointed out that the aim of most of these agencies is to provide money for the man who wants to improve, remodel or build, using not only the products of our industry, but the products of all other groups in the building business. The man or industry which makes the greatest effort to capitalize on these efforts will likely derive the greatest benefit.

Some mention should be made of such activities as the program of new home construction by some of the nation's largest corporations. These houses which exemplify the latest and most advanced construction and use of modern appliances and conveniences are intended to show owners, present and prospective, how much more convenient home owning can be today. Hundreds of thousands of families have thus been given an incentive to buy, build or improve. One corporation alone has underway 500 modern houses.

Also, we should recognize an important factor in the recommendation of the Committee for Economic Recovery which committee recently submitted to the President a comprehensive, low cost housing plan which calls for the construction of 7,500,000 new homes in the next ten years. They also recommend that at least 80 per cent of these houses shall not cost more than $6 000, ten per cent shall cost from $6,000 to $10,000. The committee also recommends construction of 250,000 houses in 1936 and 500,000 units in 1937 and 1938.

If these figures we have cited mean anything, they mean that the bulk of future construction will be in the low cost field and our products and services will have to be designed and priced accordingly.

Industry

Because so much of our work derives from industry let us see what has occurred to make industry a better customer. Through F. H. A., industry is now able to borrow up to $50,000 for betterment. New machinery, new buildings or additions, new roofs, ventilation or air conditioning systems, new fronts, new interiors are a few of the projects from which we are getting or will get work.

Added to this stimulation is better business in many lines resulting in self-financed construction. And this activity seems to be just getting under way for several years of future good business. Industry is thinking about better business and ways of getting more business.

New Products

Serious attention should be paid to those new products which have changed the complexion of the work we do and which may be looked to as replacing other lines of activity which popular thinking has discarded. The most spectacular, of course, is air conditioning. So much has been written on this subject that repetition is useless. One word of warning. Air conditioning, including both summer and winter installations, will not go through any one class of contractor just because that operator *thinks* he is the logical distributor. This work (both commercial and domestic) will go to the individual or the industry which is most aggressive.

Aside from air conditioning and its strictly special apparatus, there has been great progress made in developing new furnaces, circulators, controls, plus improvements in technique and design with the result that all kinds of heating is better today than yesterday.

New products, or more correctly speaking, new materials, have also appeared in the fields of ventilation, roofing, sheet metal and all places where sheet metal is used. These new materials have changed practices and greatly enlarged the kinds of work our craft can do. Just an example or two.

Bright metal. The new work which bright metal has brought to our shops has opened up tremendous new fields in industry and commerce. Secondly, insulation. Though our mechanics can install insulation, many contractors fail to appreciate the relationship. The ingress of insulation into domestic, commercial and industrial heating, cooling and air conditioning has been one of the remarkable sales phenomena of the last two years.

That the contractor's thinking has changed, goes without saying. We have had to change. We have had to discard notions and facts which were inviolate ten years ago in favor of newer, radical ideas which present conditions necessitate. Those who refuse to change find themselves in trouble.

More important than the changes in our own thinking are the changes in the public's thinking.

Public Thought

What the public thinks about —the public buys.

Ten years ago the public was not thinking about summer cooling. Now everyone thinks and talks about cooling all summer long and business is setting itself to give the public what it is thinking about.

Ten years ago the public was not thinking about insulation. Then higher priced fuels became popular and cooling came into favor so insulation became another thing to consider. Today every owner interested in heating, cooling or year-around comfort is thinking about insulation.

Ten years ago enamel ware was standard fixture material for kitchens. Then large hotels began to use bright metal. Today the bright metal sink, work table, counter top is just as accepted an item in remodeling or new construction as ever was the enamel ware.

Ten years ago drab exteriors and dignified, more or less somber interiors were considered standards of quality. Then color, form, light began to replace former drabness. Perhaps too far a swing was made, but few can deny that the cheerful exteriors and interiors of present-day commercial establishments are not business builders.

The examples might be continued indefinitely, but the few cited should be enough to prove that our industry (and all other industries) must follow public thinking if they are to make the sales which come easiest.

Fortunately for us, the public is thinking about our industry. Perhaps they do not recognize you as a member of this industry they are contemplating, but they are thinking of you in the aggregate. It is your task to make yourself a distinctive unit, standing out as the personification of this industry about which the public is thinking.

If you can do that, 1936 will take care of itself.

R & T Co., Employs Latest Shop Procedure for the Fabrication of Metal Specialties

The photograph above shows a 1/4-inch, 10-foot power press forming louvres for truck cab ventilators. Below, from left to right—Case assembly operations where spot welding marks are hammered out, burrs removed and parts squared up; a vending machine case before painting showing several unusual forming operations on the two doors; acetylene welding on a case; fitting sections of an electrically heated industrial oven, usually shipped in sections.

MANNED and tooled to handle contracts of any size or to work in any material; staffed by experienced men qualified to work out the fabrication and production problems for the most intricate metal item; departmentalized so that machine and mechanic skill can return the highest speed with quality; constantly seeking advice and suggestions from manufacturers, engineers and other contractors—these are the physical reasons why an increasing number of interesting sheet metal products are being produced daily by the R. & T Company, Cleveland.

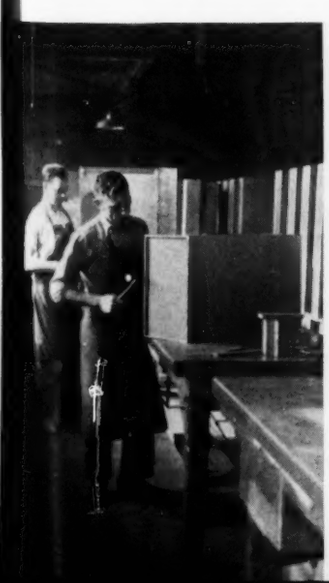
R & T, as hundreds of contractors and manufacturers know, was formerly the Riester and Thesmacher Company founded by A. E. Riester and George Thesmacher in 1900 and always one of the leading sheet metal contracting firms of Cleveland.

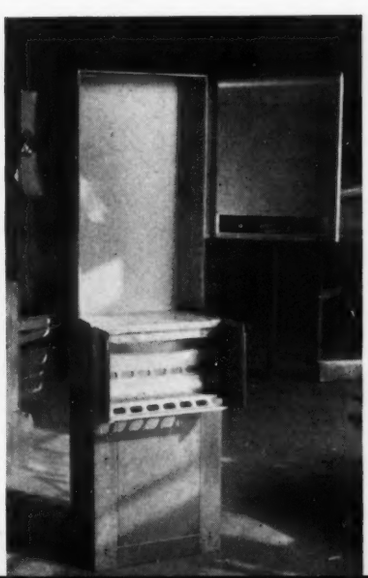
These products now in active production are not manufactured as production items to be sold by the R & T Company—the items are all made on special order to some customer's specifications. The firm, from its years of experience is able, however, to assist the customer in the design and construction details which may seem more practical to the company. At the present time products fabricated from sheet metal include motor testing equipment, radio tube testing devices, gasoline service station equipment, stoker equipment, brewery equipment, tables, cabinets, etc., x-ray equipment, industrial ovens and vending machines, as well as institutional products such as cases and cabinets, storage and exhibition cabinets for museums, universities, hospitals and food service equipment for hotels, restaurants, cafeterias, etc.

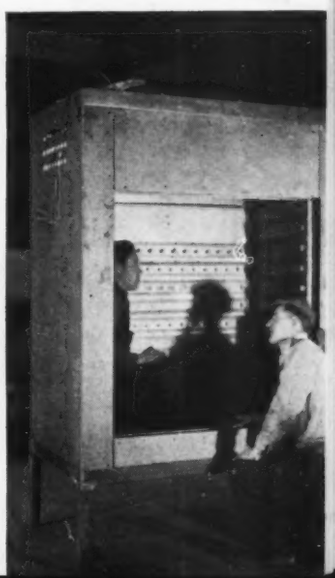
The procedure for layout, fabrication, assembly of any one of these dozens of items can be emphasized by following an item through the shop. Departmentalization has set up the following steps in manufacture: Office recording of the order; layout; shearing; machine operations, such as notching, punching, braking, forming, etc.; assembly, including spot welding, arc welding, gas welding, grinding, polishing, filing; finishing, including cleaning, filling, sanding, spraying, graining, rubbing, baking, crating and shipping.

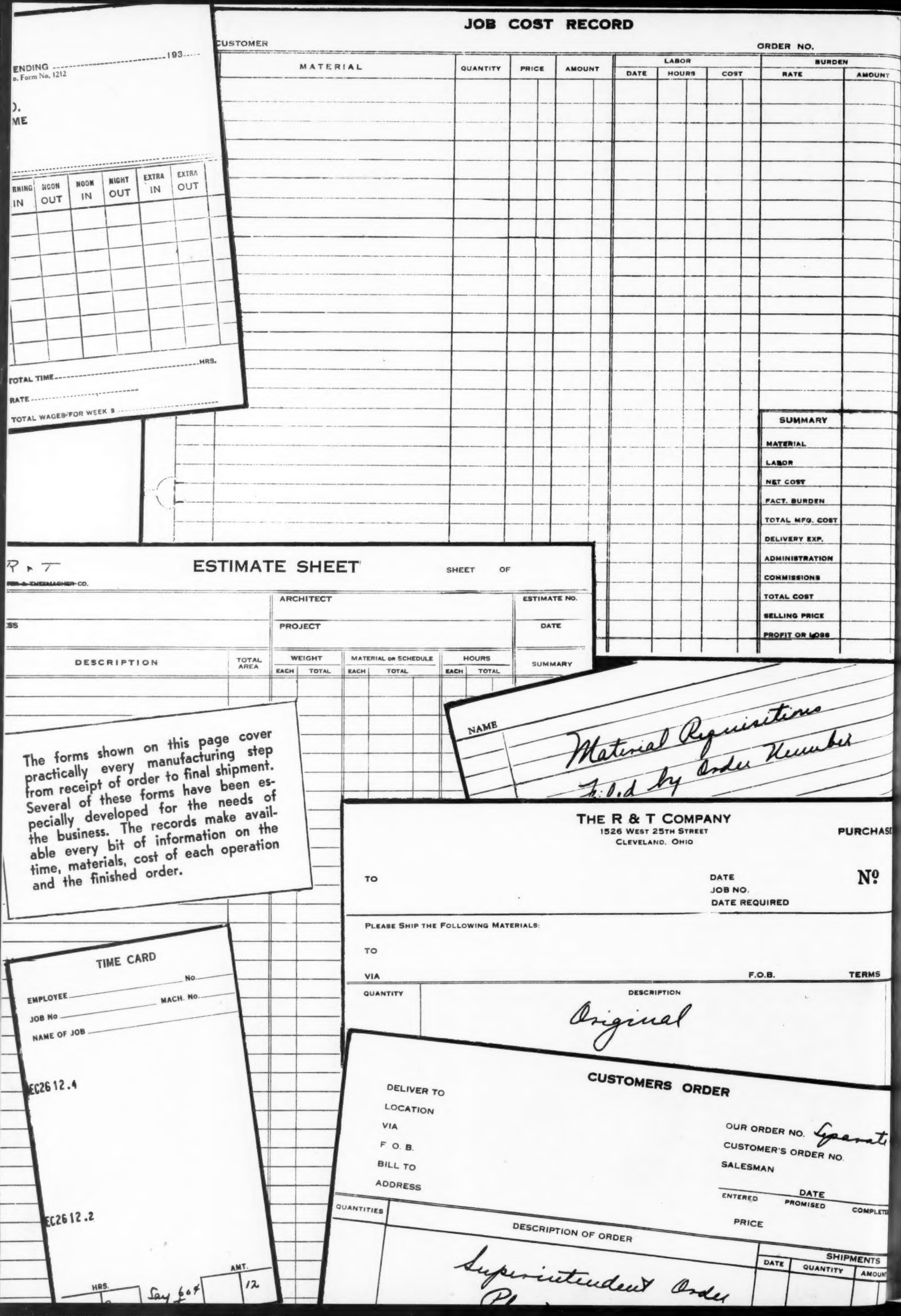
Some of the illustrations show typical office forms used to keep perpetual track of work on every order. Upon receipt of an order proper entry is made through the order register at which time a job is assigned a shop order number.

The order then written on forms is made in triplicate, the original serving as the office cost record; the second goes to the superintendent; the third goes to the shipping de-

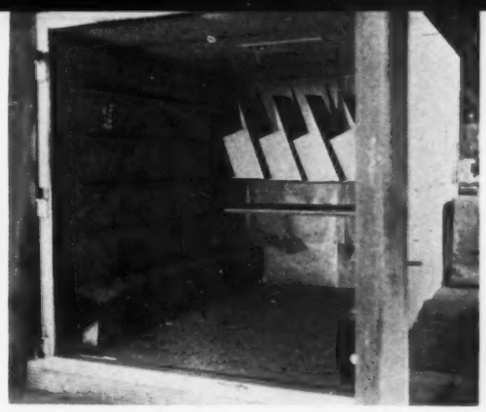






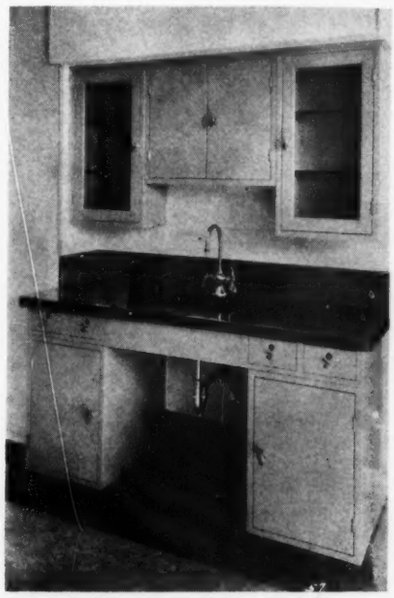


The forms shown on this page cover practically every manufacturing step from receipt of order to final shipment. Several of these forms have been especially developed for the needs of the business. The records make available every bit of information on the time, materials, cost of each operation and the finished order.



partment. All items of cost, as they come up, are charged against the order number. Materials, if out of inventory, are requisitioned and signed for either by the storekeeper or the superintendent. If purchases have to be made a written order is made out and copies go to the stock keeper and is checked upon receipt. Such materials are also charged against the job number.

Each mechanic keeps a weekly clock time record which is punched in and out every day. In addition each mechanic has a daily time slip which is punched at any one of several clocks as a new piece of work begins or is completed. When a job is completed the shop order is turned in to the office with cutting sheets, sketches and other information which were necessary on the work. Shipments and invoices are checked against the office record and the job is then closed, materials and labor are summarized, factory and administrative burden is added and the costs entered in the sales journal for bookkeeping. Finished orders are kept for future reference by filing the office record alphabetically



Cabinet and sink developed and produced for hospitals.

The photographs above show—Left, a precision forming and assembling product of No. 11 gauge material. Tables are arc welded and are shown complete ready for painting. Center —special order of flower vases painted and unpainted. Right—enamel drying oven gas-fired for 450 degrees temperature.

◆ ◆

while the shop or superintendent's record is filed numerically in loose leaf binders.

Machine Operations

Machine operations have been carefully worked out, particularly for soft metals or bright metals. Sharp shear blades are used to avoid burrs and scratches which may mean additional future finishing. In handling materials which have a polished or grind surface, all benches are covered with wax paper or composition board. Also, the sheets are covered with wax paper and a good lubricant is used during forming or stamping operations to avoid die marks. Stainless steel is covered with whiting which is left on until the part is ready for use.

Jigs and dies are the best obtainable according to the quantity which is made from any one set. Materials for jigs and dies, such as punch, multiple forming, blanking or stamping dies, welding jigs and fixtures are the usual items used in these operations.

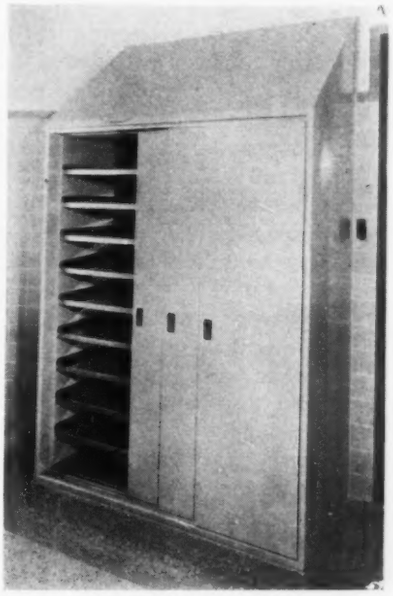
Welding

A large amount of welding is employed. The company has found that the efficiency of any welding operation is entirely dependent on the skill of the workman. Spot welding is, of course, the simplest welding operation, precautions being taken to see that the machine used has sufficient heat to do the work specified. Gas and arc welding, however, have been found more specialized and careful training has been given operators so that any intricate welding operation, in any material, can be turned over to a specialist. Careful attention is paid to securing just the proper welding wire and flux according to the material or alloy.

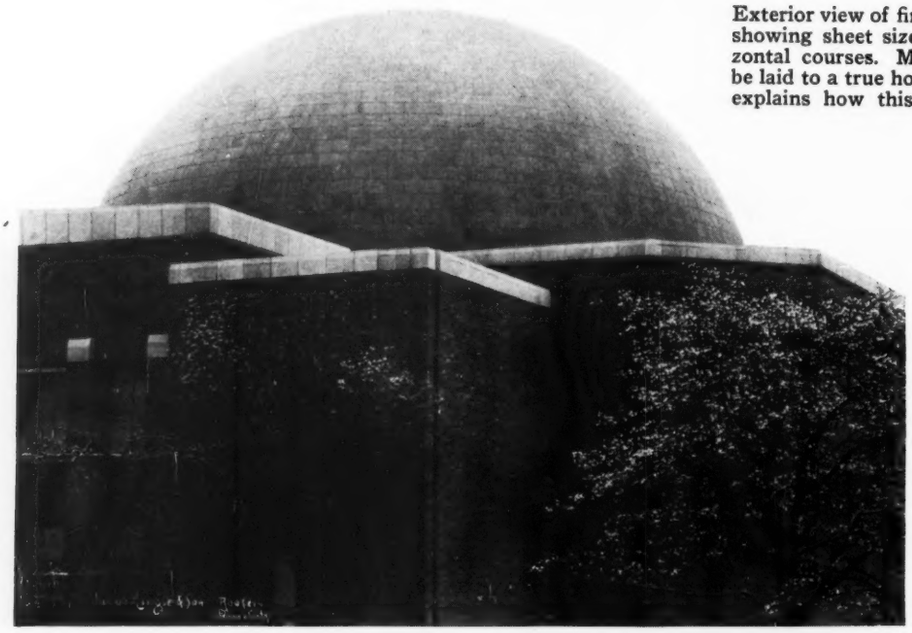
As a result of this training and careful supervision the company experiences little difficulty in shop operations regardless of the material or item. During 1935 items using black and galvanized steel, tin and terne plate, sheet copper, aluminum and the stainless steels, sheet lead, lead coated copper were used. Also commercial steel shapes such as channels, angles, bars and extruded aluminum were employed.

The company has made a practice of advising the manufacturer of the metal just what will be done with the material and what forming or machining operations will be applied. Materials of the proper hardness or softness are therefore used rather than attempting to adopt an improper material.

A modest paint department consisting of a spray booth completely equipped and one gas fired bake oven is used. At present about 90 per cent of all products are sprayed and for some time past wrinkled or crackled finishes have been preponderant.



A storage cabinet of standard production used by hospitals.



Exterior view of finished dome showing sheet sizes and horizontal courses. Metal had to be laid to a true horizon. Text explains how this was done.

Outside and Inside Metal Domes Built to Last 100 Years

By R. C. Nason

WHEN engineers acting for the American Museum of Natural History, New York City, a year ago planned a de luxe astral observatory, now known as the Hayden Planetarium, no consideration was given to any but materials that will last more than a century. The resulting structure actually is expected to endure twice this long.

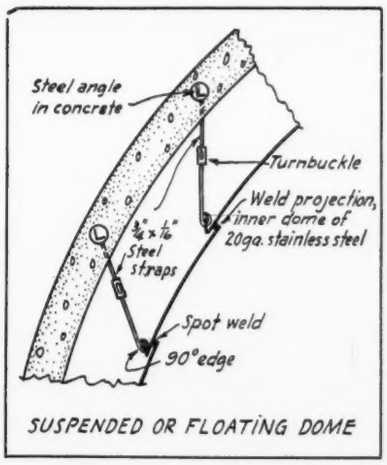
Hence, it is not surprising that a weather-proof metal was selected for the exterior covering. Stainless steel is used on the inner, or "projection," dome and between the copper exterior and stainless interior is a 3-in. reinforced concrete shell. Altogether some 23 tons of sheet metal were used to make this an outstanding piece of modern engineering skill and expert craftsmanship.

That the function of the Hayden Planetarium may be understood, let it be said that pictures of the sky are flashed onto the projection dome at intervals throughout the day and evening via the medium of a large and excellent telescope. Stars, planets and all other heavenly bodies are shown precisely as they appear in the lense of the telescope.

One of the most difficult sheet metal structural problems occurred in connection with formation and suspension of the five hundred and sixty-seven 7-foot 3-inch high stainless steel sheets that make up the projection dome. Instead of attaching sheets snugly to the superstructure in what would be considered the ordinary method, the entire interior, or projection, dome is suspended. Museum officers refer to it as a "floating" dome.

Some 15 tons of 20-gauge stainless steel sheets were required to make this dome, work being handled by The Acoustical Construction Co., New York City, a subsidiary of Johns-Manville Co., who also furnished the sound insulating material. As the inside diameter of the dome is 75 ft. net, it was obviously impossible to avoid making and handling a large number of sheets.

The planetarium stands inside a group of buildings. The architects specified a construction and materials which will last for at least 100 years. Copper outside and stainless steel inside were adopted.



The several hundred ceiling sheets were suspended and welded together as shown in this detail. See text.

There are eight sheet courses in addition to a 42-inch diam. crown sheet. The width of a bottom-course sheet is 33 inches net. Top course sheet width is 19 inches.

To appreciate the difficulties in fabrication and erection it should be understood that a cross section of the completed roof includes the aforesaid exterior copper covering, a single layer of roofing felt, concrete shell varying from 3 inches to 3½ inches in thickness, 1½ inches of rock cork insulation and the suspended projection dome already outlined.

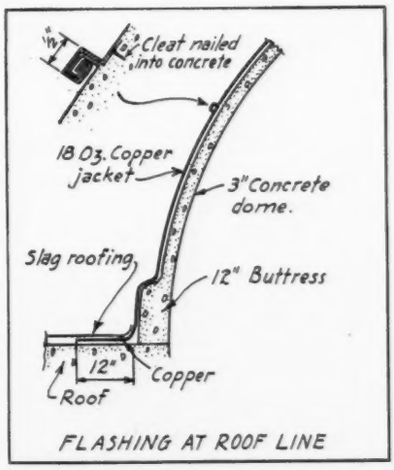
Erection began with the cork and the concrete. Into the latter were sunk nine concentric rings of T-shaped bar anchors from which the steel projection dome sheets were suspended by ¾ inch wide by 1/16 inch thick perforated stainless steel straps. Work on the projection dome sheets began at the top with the laying of the crown sheet. Courses of trapezoidal - shaped sheets followed, there being eight courses, until the base of the bottom course ended 9 feet from the floor. The suspension straps surround the concrete-inset bars and are bolted top and bottom, to the bars, above, and to sheet lugs, beneath. A turnbuckle for each strap provides for adjustment. Sheet lugs are three in number, two on side flange, one on bottom flange.

Ceiling Welding

Spot welding by electricity tied all sheets together, spots being 1 inch apart. To provide anchorage for suspension rods, or straps, 1-in. flanges, turned outward, were given to one long side and to the bottom of each sheet. Sheet overlap for welding is ⅜ inch all around.

Adjustment via the turn buckles is hoped to be averted because the entire building is insulated and air conditioned, temperature being maintained between 65 and 70 F and 50 per cent relative humidity at all times, thus avoiding warping and buckling due to climatic changes causing expansion and contraction.

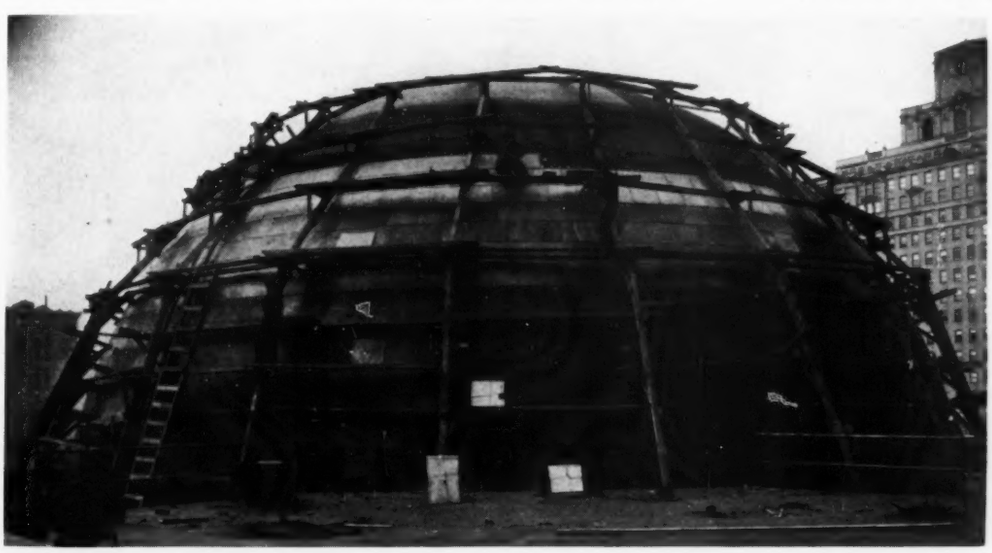
Acoustics play a tremendous part in making lectures in a planetarium of this sort successful. Were unbroken dome surfaces used echoes would be offensive. So, all projection dome plates were perforated with 1/16-inch diameter holes 3/16 inch on centers and staggered, perforation work being done by Chas. Mundt & Sons, Newark, N. J. Sound filters through the holes to the cork insulation behind, where it is absorbed.



Exterior sheets were laid and locked as shown here. Top course sheets are soldered and locked.

In forming sheets for a true hemisphere of this sort it is apparent that each must be slightly narrower at both base and top, according to course. Sheets adjacent to the crown are almost triangular. Patterns were made for each course by standard methods, templates made for shearing, flanges turned 90 degrees on power brakes, lugs welded on. Fabrication was done in the Mundt and Budd Mfg. Co. shops and shipped to the Planetarium in bundles ready for erection.

(*Continued on page* 140)



Copper sheets were laid from the bottom up. True horizon course lines were maintained by a template pivoted at the apex of the dome.

The Warm Air-Fan System of Heating and Ventilating for Large Buildings

By Platte Overton
Consulting Engineer

In this third article of the series the author discusses washers of the size and types used for large building work. The page opposite shows a variety of washers with features of design which make each type suitable for its particular class of work.

✦

Air Washers

AIR washers or the idea of washing air used in public buildings is far from new. The modern air washer is only a scientific development of the crude washer used back in the 80's and these first washers were far from being failures.

The scientifically designed and constructed washer, while not used so extensively since the advent of the practical and inexpensive filter, has a place in the heating and ventilating and air conditioning field. The spray and scrubber type of washer is usually used in modern ventilation, due to its flexibility of control and its efficiency.

The type of washer shown and discussed in this article must not be confused with the so-called washer developed and used in connection with resident work in the past few years. A standard air washer is used for one or more of the following four items: Cleaning, Humidifying, Dehumidifying and Cooling.

While the question of humidification in heated buildings is of more consequence than is usually supposed, it will not be discussed here. Space and time does not allow for any extended explanation of humidification and its many ramifications. Any manufacturer of standard air washers will send the reader literature on the subject. Fig. 5 is a rough idea of the stages of treatment of air in a standard air washer. Stage one is divided by diffuser baffles or some device to distribute the air evenly over the entire area of the washer passage. Stage two is the water spray. This may be in one or more banks. Two are shown. Stage three is the spray chamber and must have a certain length, depending on the purpose of the washer. Stage four is the eliminator. This eliminator serves the purpose of removing the spray water or moisture that has been absorbed by the air. If plates are kept covered by a thin film of water from overhead sprays or scrubbers, they are then termed scrubbers. The air in its zigzag passage through the eliminator comes in contact with these wet surfaces and deposits the final spray water from the spray chamber and with it the dust and dirt from the air; hence, the final cleaning stage is accomplished.

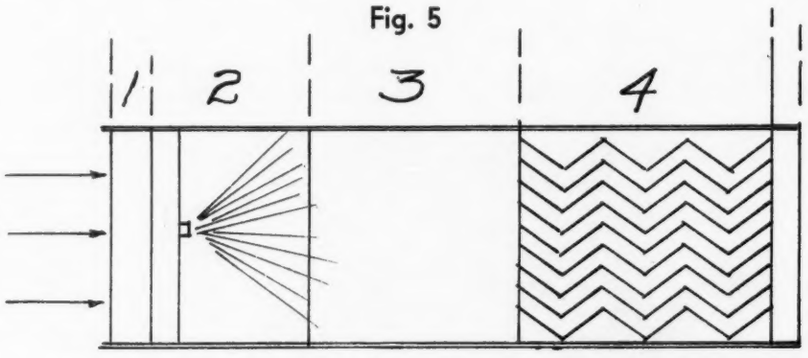
Various standard measurements are required for certain results; thus one kind of washer is required for humidifying and cleaning. Where the prime requisite is for cleaning only, this type of washer accomplishes the results. Another type for cleaning only and a third type for all these items including the humidifying and cooling.

These various duties call for a predetermined number of spray banks, set of spray chambers and bank of the eliminators or scrubbers and area of washers for various velocities.

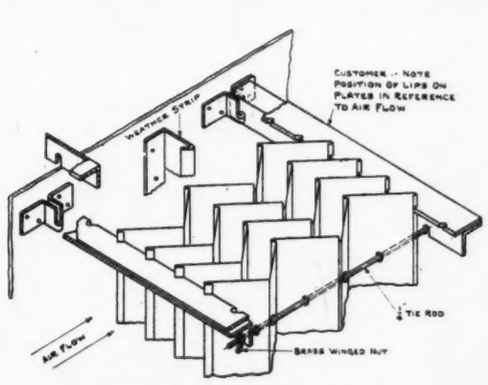
These items will not be discussed here. It is only necessary that the following fact be kept in mind: That with the proper washer it is possible to clean, humidify, dehumidify and cool, the cooling depending on the temperature of the water in the sprays.

Three types of washers are shown in Figs. 6, 7 and 8. Fig. 6 is the least expensive and has a single bank of sprays. This washer is for cleaning and humidifying only. Fig. 7 is a washer with sprays and scrubbers and is so arranged that it is possible to cut off the sprays and use the scrubbers only for cleaning with some degree of cooling. This method is used if there is danger of over humidifying with the sprays in warm weather. Fig. 8 is the type of washer that, with the proper controls, one or all of the four items may be accomplished, the cleaning, humidifying, dehumidifying and cooling.

Fig. 5



Drawing showing treatment of air as it passes through a theoretical washer. Most washers function on this general principle.



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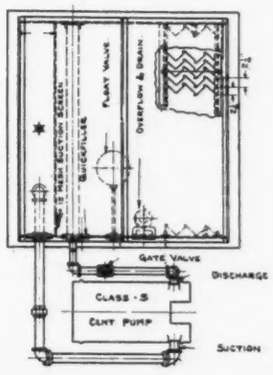
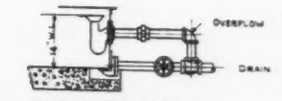
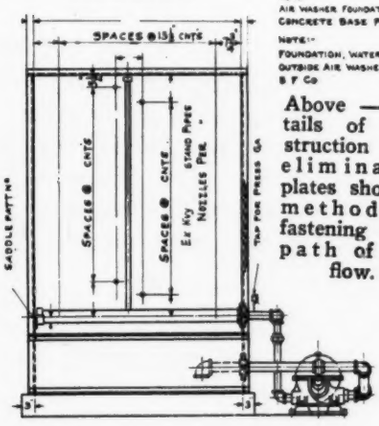




DETAIL OF OVERFLOW & DRAIN
OUTSIDE PIPING NOT FURNISHED BY B.F. Co.



Above — Details of construction of eliminator plates showing method of fastening and path of air flow.

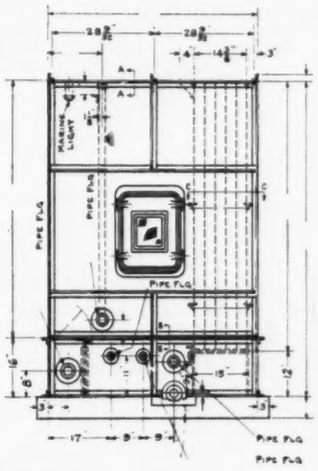
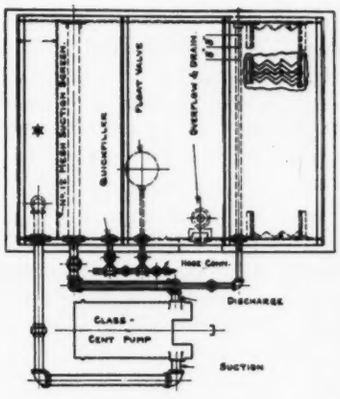
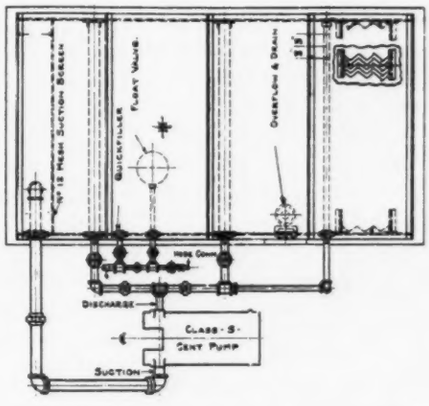


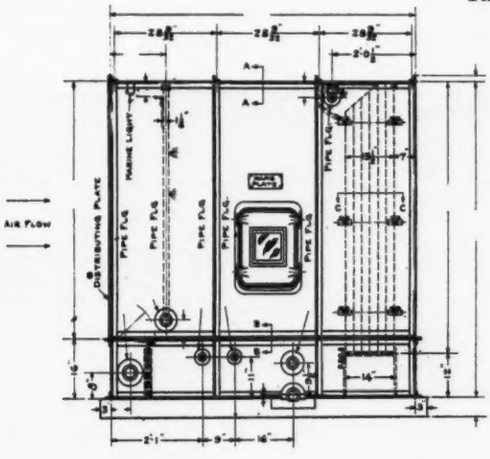
Fig. 6—Simple washer with sprays and plates for cleaning and humidifying under certain conditions. The details show standard construction features.

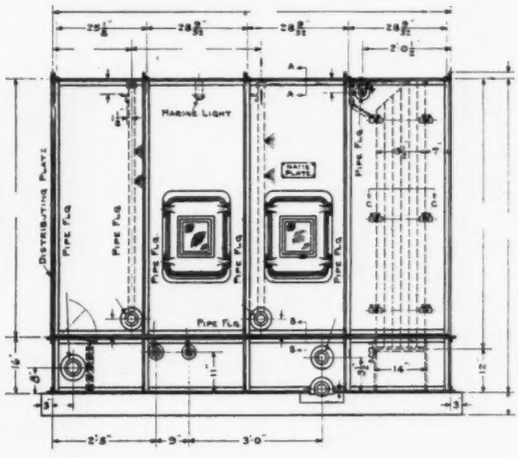


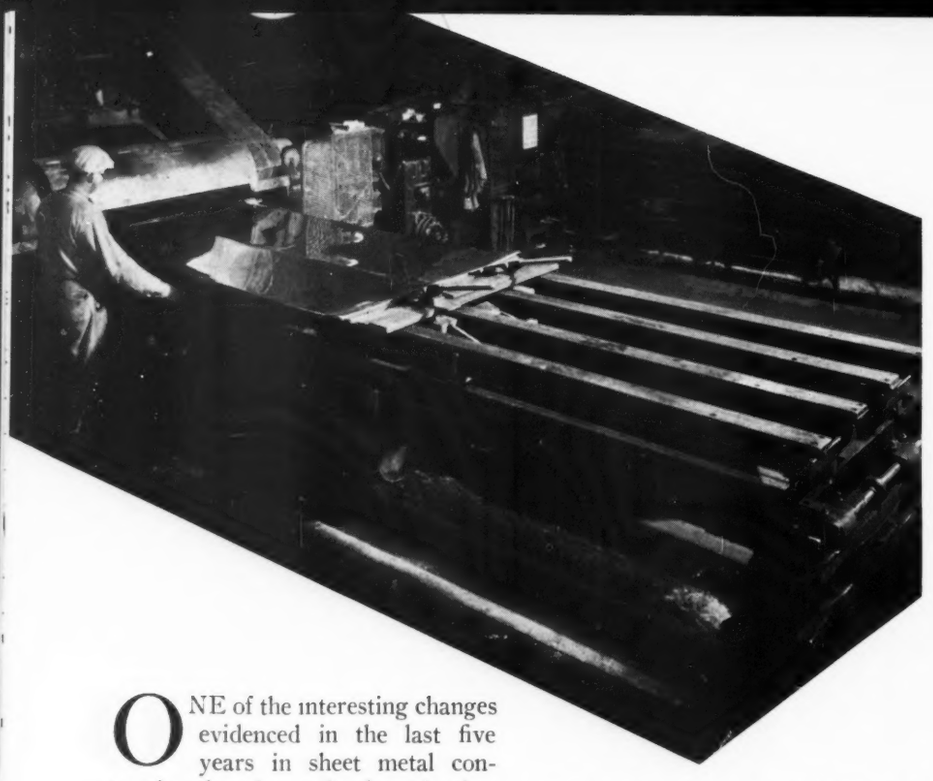
Left—Fig. 7 — Plan and elevation (below) of washer with sprays and scrubber plates and arranged so that both or either may be used at will.

Right—Fig. 8.— showing a larger washer with sprays and plates and designed for cleaning, cooling, dehumidifying and humidifying. The elevaton is below.









Bright Metal—A Survey of Its Uses and Possibilities

This article is the first of a series in which all the fabricating characteristics of bright metals will be discussed. The page facing shows a tabulation of uses by typical contractors.

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ONE of the interesting changes evidenced in the last five years in sheet metal contracting has been the introduction and wide adoption of bright metals by the metal contractor or fabricator and by the public.

This acceptance came about because of the material's inherent qualities and because: First, architectural metal work decreased in volume with the falling off in large building construction compelling contractors to find new activities. Second, the architectural trend toward straight lines and little or no ornamentation destroyed one of the sheet metal man's established markets. Third, the widespread movement among commercial establishments to modernization, using modern design and color schemes, made bright metals popular. Fourth, a growing tendency to use bright metals for ornamentation and for the basic material of hundreds of commercial products focused the public's attention on this material. Fifth, acknowledgement by industry that cleanliness, sanitation and ability to keep establishments clean with a minimum of time and labor made tarnish-resisting materials popular.

Some History

It is probable that bright metal received its first impetus to popularity from the large buildings of 1929 and 1930 where bright metal proved its architectural attractiveness and durability and to the use of bright metal in industries where absolute cleanliness is a necessity.

Architects, industrialists, operators of all types of commercial establishments viewing these early uses of this attractive material visualized in bright metal's characteristics the answer to their own problems and straightway adopted some form of the metal to their own needs. Acceptance widened progressively with new uses occurring rapidly. In some industries bright metal revolutionized processes and plant operations; in other industries its adoption made possible wholly new methods and cost savings.

To meet this growing popularity the manufacturers of the first bright metals announced additional metallurgical forms, each designed to meet specific needs. Other firms introduced still newer materials employing bonded, laminated, composite formations—each possessing peculiar characteristics of workability, price, appearance, finish and so forth.

Side by side with this introduction of materials by the mills, the sheet metal fabricators took these new materials into their shop and rapidly worked out fabrication and construction details which enabled the materials to meet in a practical manner all the peculiar demands of this vast army of potential users.

Working cooperatively manufacturers and fabricators worked out methods of protection, welding, soldering, machining, forming, and finishing so that the completed product was as good looking and substantial as the material of which it was made.

The problems of producing bright metals suitable for the many uses desired by industry and the problems of fabricating the material constitute an epic story of our industry. Further, after these five years new uses are still coming into view, in some instances necessitating the solution of still other problems not so far encountered. The successful contractor must therefore know the solutions already arrived at and be able to apply fundamental informa-

(*Continued on page* 144)

Tabulation of Bright Metal Uses

Contractor No.	Pounds Used in 1934	Pounds Used in 1935 (Estimated)	Types of Metal Used Most Commonly	Do You Buy from Mill or Jobber?	Do You Require Information on Material?	Items Fabricated for Use in Residences	Products Fabricated for Users Other than Homes
1.	None	10,000	Enduro "S" No. 425 Enduro HCN				Hot end of tempering oven bought for heat resisting qualities.
2.	1,200	3,000	Allegheny & KA 2	Jobber	Yes	Dumbwaiter doors and bucks.	Dumbwaiter doors and door jambs, developing tanks for photographers, table tops.
3.	4,075½	4,075	Enduro 18-8 U.S.S. 18-8	Jobber	Mfr.	Kitchen sinks.	Bar and kitchen equipment, drains, sinks, steamtables, serving tables, linen closets, cupboards, kitchen wall linings, metal boxes, meat and fish packing plants, money trays and racks, coffee urns, condensation canopies.
4.	8,000	8,000	Monel and Rezistol	Jobber	No	None	Kitchen and laundry equipment.
5.	1,500	1,500		Jobber and Mill	Yes	None	Milk plants, special funnels for dye plants, store front work, tanks for special solutions.
7.	375	500	Monel .025x36x96, Finish No. 8	Jobber	No	Sinks, table tops, drains.	Back bars, candy bins, special tanks, restaurant trim.
8.	300	...		Jobber	Yes	Sinks and work boards.	Bar fixtures, sinks, store fronts, signs, hospital appliances.
9.	4,000	1,000	No. 4 Finish	Jobber	No	Kitchen sinks.	Electric signs, work boards, dish washing machines, skylights, sinks of all description.
10.	1,000	4,000	Well annealed, pickled finish, minor quantity polished finish.	Jobber and Mill	Yes	Special shelving, etc.	Shelves, platters, pans, storage bins, hoppers, trim, etc.
12.	400	600	Allegheny — mostly No. 8 finish. Some Monel.	Jobber	No	Sinks, table tops.	Pans, sterilizer trays, medicine shelves, bottle holders, jar covers (large).
13.	200	300	Bright on one side.	Jobber	No	Drain boards and boxes.	Drain boards, barber shop sterilizers, tops for bars and soda fountains, shelving for restaurants.
14.	2,500	3,000	Enduro	Jobber	No		Hotel equipment, bar equipment, coolers, sinks, table and cabinet, etc.
15.	500	4,000	Soft bright finish.	Jobber	Yes	Sinks, drain boards, package receivers, etc.	Those listed in answer to column 7 plus soda fountains, bars, chocolate warmers, fudge warmers.
17.	2,000	4,000		Jobber	Yes	Board covers.	Ventilation ducts, cabinets for hospitals, sinks, drainboards.
18.	3,903	5,000	KA-2 (18-8) KA-2 SMO (for welding)	Both	No		Pickling baskets, tanks, special mouldings and shapes, cylinders, trim.
20.	200	200	Monel Metal	Jobber	Yes	None	Refrigerator linings, pans, tanks, table tops.
21.	2,550	2,548 (6 mo.)	Monel	Both	Yes	Drain-boards.	Skylights, buckets, table tops, cabinet tops, sinks, doughnut cutters.
23.	200	1,500		Jobber	No	None	
25.	30,000	50,000	KA-2 No. 4 Finish in all gauges.	Jobber and Mill Also	No	Sinks, splash backs and cabinets.	Urn stands, water coolers, steam tables, glass racks, refrigerators, cold pans, work tables, dish tables, sinks, counters, beer dispensers.
28.	25	50	Monel Metal	Jobber	Not Yet	Back bars, chemists tables, tanks.	
29.	600	2,000		Jobber	Yes	Dumbwaiter doors and bucks.	Dumbwaiter doors and bucks.

Ventilating Systems for Machine Operators

The cheapest and most flexible air exhaust system for dangerous industrial fumes consists of a blower connected to individual hoods placed at each machine. Such a system can be partially shut down or wholly opened as contrasted to room ventilation where all or none is necessitated. The author makes a point in present laxity in health laws which gradually will be tightened up. The drawings opposite show a number of variations of the basic system.

By J. W. Baybutt
Instructor, Rochester Athenaeum and Mechanics Institute

IN THE past few years cost of production in many industries has been cut to a point where no allowance has been available for proper ventilation for protection of machine operators.

During this period some insurance companies and state departments, concerned about health, seem to have been lenient with manufacturers in allowing operation under conditions not generally considered conducive to good health. That this arrangement has not caused any particular harm may likely be due to the irregular employment which has provided recovery periods to offset temporary exposure to foul air conditions.

Many Prospects

In the interests of increased sheet metal business, it may be well for contractors to sit down and make a list of industries in their neighborhood which have overlooked ventilation in their plants during this period, but are now in a position to improve conditions if attention is called to the need. Wood and metal specialties, manufacturing, plating, chemical plants, foundries, refineries and packing houses are just a few of the possible leads to new ventilation business.

The accompanying sketch Fig. 1, illustrates a typical ventilation layout for a metal specialties manufacturing establishment where acid fumes and carbon dioxide gas are generated in the soldering processes.

Soldering Furnaces

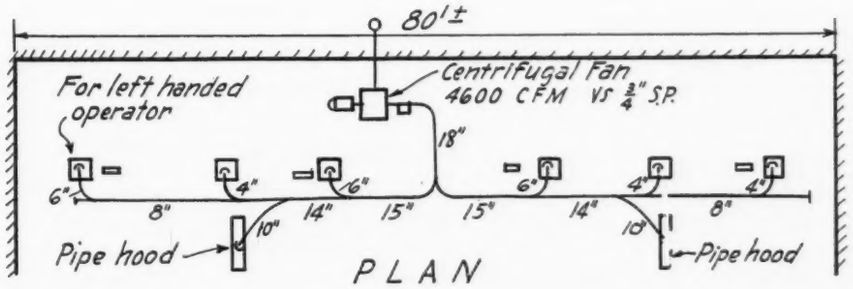
Fig. 2 shows the detail arrangement of the gas fired soldering iron furnace with acid pot and suggested hood, which arrangement has worked out on numerous jobs. The enclosure around the furnace removes the heat in the summer time in addition to the products of combustion. During the winter period the suction on this hood can be cut down, of course, just sufficient to handle the combustion gas. Any hood or nozzle can be dampered off when not needed without impairing the remainder of the system as would apply in a material handling system. The 2 by 6-inch nozzle is suggested for general small parts work. For long pipe or pan work the nozzle should be increased to the full length of the supporting iron as illustrated in Fig. 3.

As this system handles only fumes, the connections can be made into the bottom of the mains eliminating ells with their accompanying resistance. The piping can be sized to keep down the resistance, say a maximum velocity of 2500 C.F.M. The nozzles should be designed to pick up the fumes, but to offer minimum interference with the production operations, ¾-inch of water suction at the nozzles has proven ample for this type of service. The fan discharge should be carried clear of the building, preferably to a point above the roof, although a high outlet velocity at the fan may cause enough dissipation of the fumes with the outside air to be satisfactory even though the air mixture blows back into the building.

Sheet Metal

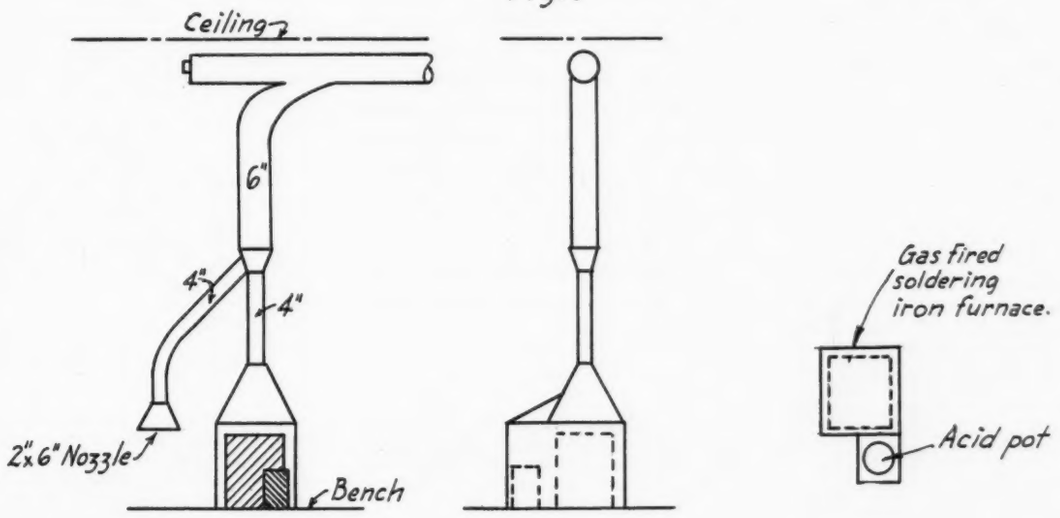
Standard ventilation pipe gage galvanized iron duct work should be satisfactory for this service, preferably painted inside with asphaltic base paint or equal.

When we see so much concern shown by health authorities over the food and water our bodies consume, and knowing that the body uses at least ten times as much air by weight as either food or water per day, we should not be bashful in recommending improvements to guarantee purer air for either man or beast.



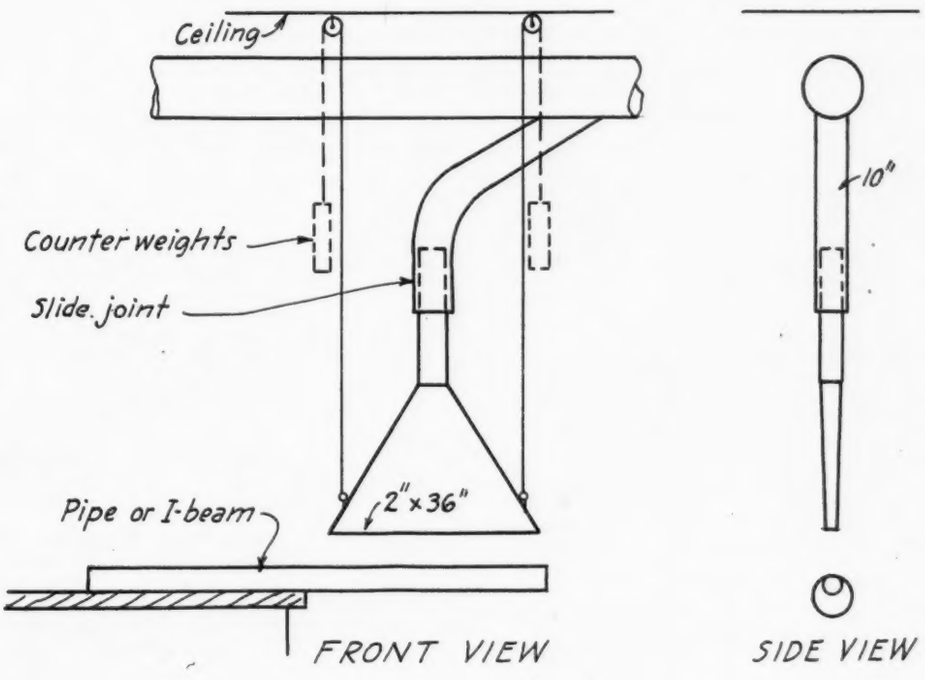
PLAN

Fig. 1



FRONT VIEW SIDE VIEW PLAN

Fig. 2



FRONT VIEW SIDE VIEW

Fig. 3

The Minneapolis Heating, Ventilating and Air Conditioning Ordinance [Part 4]

PART XII

MECHANICAL WARM AIR HEATING AND AIR CONDITIONING

Section 1201. Definitions: For the purposes of this ordinance the following definitions shall govern as to the meaning of the several terms and expressions so defined, wherever said terms and expressions are employed in this ordinance:

(a) A mechanical warm air heating plant shall consist of one or more warm air furnaces enclosed within casings, together with necessary appurtenances thereto, consisting of warm air supply pipes and fittings, cold air or recirculating pipes, ducts, boxes and fittings, smoke pipes and fittings, dampers and registers, faces and grilles, fans or blowers, the same being intended for heating the buildings in which they may be installed. The circulation of air within such a system shall be dependent upon the motive power furnished by a fan or blower, and the duct work in connection therewith shall be designed especially for such system.

The incorporation of an air washer, filters, humidifier, cooling coils, automatic controls or other devices shall not be construed as changing the classification of such a system unless by the incorporation of some one or more of the above mentioned devices such system fulfills the requirements of one of the classifications immediately following.

(b) A warm air all year air conditioning system shall include a mechanical warm air heating plant, such as hereinbefore defined, together with such other devices and such automatic controls as will secure the simultaneous control of the temperature, motion and humidity and a reduction in the dust and odor content of the air employed in the ventilation of rooms. This includes both warming and humidifying in winter and cooling and dehumidifying in summer.

(c) A warm air winter air conditioning system shall include a mechanical warm air heating plant, such as hereinbefore defined, together with such other devices and such automatic controls as will secure the simultaneous control of the temperature, motion and humidity, and a reduction in the dust and odor content, of the air employed in the ventilation of rooms, but not provided with such devices and automatic controls as will provide for cooling and dehumidifying in summer.

Sections 1202. Amount of Air to be Circulated, How Determined: The amount of air to be provided for each room or space to be heated or conditioned shall not be less than that determined in the following manner:

The first Minneapolis code was formulated in 1926. This revised code, effective this spring, was written chiefly by the Building Inspection Department from its experience.

The first part of the ordinance, published in our October issue, covered methods of securing contracts. The second article (November) covered the selection of smoke pipe sizes and design of gravity systems. The third article, December, covered setting the furnace, wall stacks, leaders, return air.

This issue deals with design of forced warm air systems and automatic fuel furnaces.

◆

(a) Calculate the heat loss from each room to be heated, in B.t.u. per hour, as determined in Part II of this ordinance; add ten (10) per cent for factor of safety.

(b) Assume an average temperature in the warm air supply ducts and also in the cold air return ducts. These temperatures are usually assumed to be 135 degrees Fahrenheit for the warm air and 65 degrees Fahrenheit for the cold air. The difference between these two values is the temperature drop.

(c) Calculate the weight of air to be circulated to each room, using the formula:

$$W = \frac{H_1}{0.24 \times T_d}$$

Where W = weight of air to be circulated in pounds per hour.
H_1 = Total calculated heat loss in B.t.u. per hour, plus ten (10) per cent safety factor.
0.24 = Specific heat of air.
T_d = Temperature drop.

(d) Obtain volume of air, in cubic feet per minute (q), for warm air and cold air, as follows:

$$q = \frac{W}{60d}$$

where q = volume of air in cubic feet per minute.
d = density of air in pounds per cubic foot at assumed average warm air or cold air temperature and standard barometric pressure (29.92 inches of mercury).
60 = conversion factor from hours to minutes.

Values of d may be obtained from any standard tables on properties of air.

Section 1203. Duct Design; Size of Ducts, How Determined: Ducts may be either round or rectangular. Rectangular ducts should be as nearly square as possible; the width shall not be greater than four (4) times the depth. The radii of elbows shall be not less than the pipe diameter, for round pipes, or the equivalent round pipe size in the case of rectangular ducts. Provided, however, that in old buildings, where strict compliance with the foregoing provisions in regard to elbows would be impracticable, special permission may be granted by the Inspector of Buildings for deviations from such provisions.

The ducts or piping may be designed either as a trunk line system or as a system of individual ducts from the furnace to each register. Individual ducts may be grouped to simulate a trunk duct system in appearance.

In the design of any duct system, the following procedure shall be adhered to in determining the sizes of the various ducts throughout the system:

(a) Study the plan of the building and draw in roughly the most convenient system of ducts, taking cognizance of the building construction. avoiding all obstructions in steel work and equipment, and at the same time maintaining a simple design.

(b) Arrange the positions of duct outlets to insure the proper distribution of heat.

(c) Divide the building into zones and proportion the volume of air necessary to supply the heat for each zone.

(d) Determine the size of each outlet, based on the volume as obtained in the preceding paragraph, for the proper outlet velocity.

(e) Calculate the sizes of all main and branch ducts by either of the following two methods:

1203.1. Velocity Method: Arbitrarily fix the velocity in the various sections, reducing the velocity from the point of leaving the fan to the point of discharge to the room. In this case the pressure loss of each section of the duct is calculated separately and the total loss is found by adding together the losses of the various sections.

1203.2 Friction Pressure Loss Method: Proportion the duct for equal friction pressure loss per foot of length.

1203.3 Total Resistance, How Determined: Calculate the friction of the duct, both supply and return, which offers the greatest resistance to the flow of air. This shall include the resistance of all elbows or other fittings, registers and air inlet. Add to this the resistance of filters, air washer, furnace or other devices located in the air

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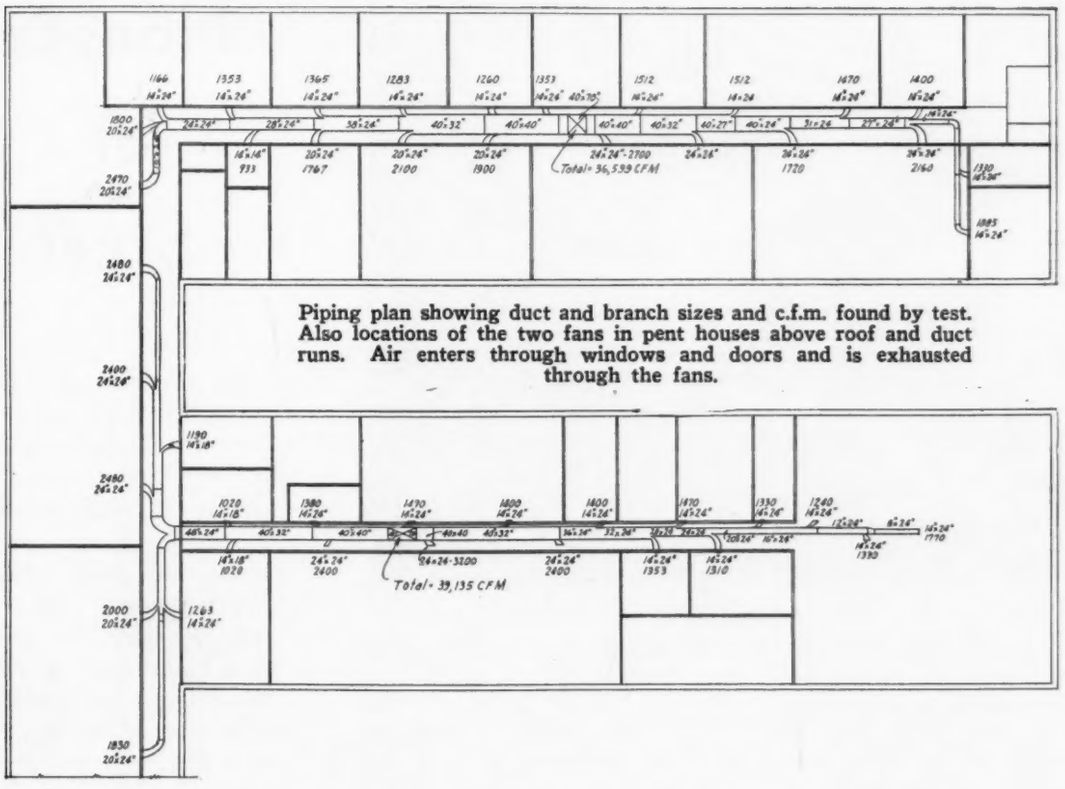

Piping plan showing duct and branch sizes and c.f.m. found by test. Also locations of the two fans in pent houses above roof and duct runs. Air enters through windows and doors and is exhausted through the fans.

Exhaust Type Ventilating System For An Industrial Office

VENTILATION, one of our industry's oldest activities, in the last two years has assumed increased importance as industry and commerce have turned to ventilation as a practical solution to the problem of better, more comfortable, working and business conditions. Where cooling has not been feasible, straight ventilation has frequently proved practical as for example the ventilation installation shown in the accompanying plans for the Warner Gear Corp., Muncie, Indiana.

This particular system might be called ventilation in reverse since air is pulled into the building through windows and doors and withdrawn by the double fan system having a capacity of 72,000 c. f. m. giving one air change every five minutes.

The plan of the office floor shows the general layout of the system. The floor is U-shaped with two long wings extending outward from the

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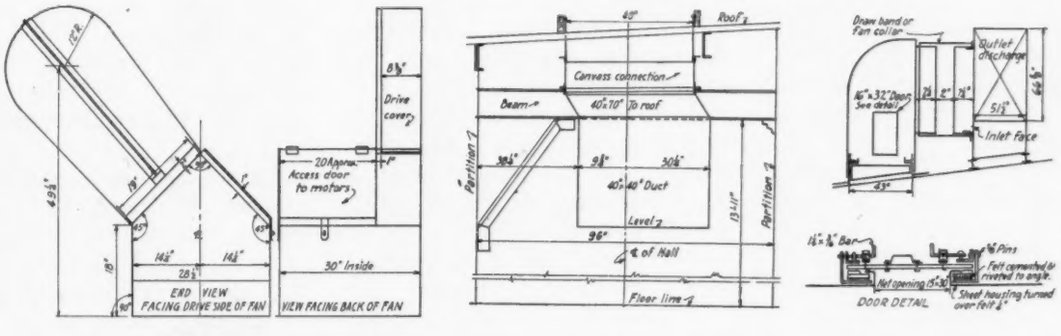
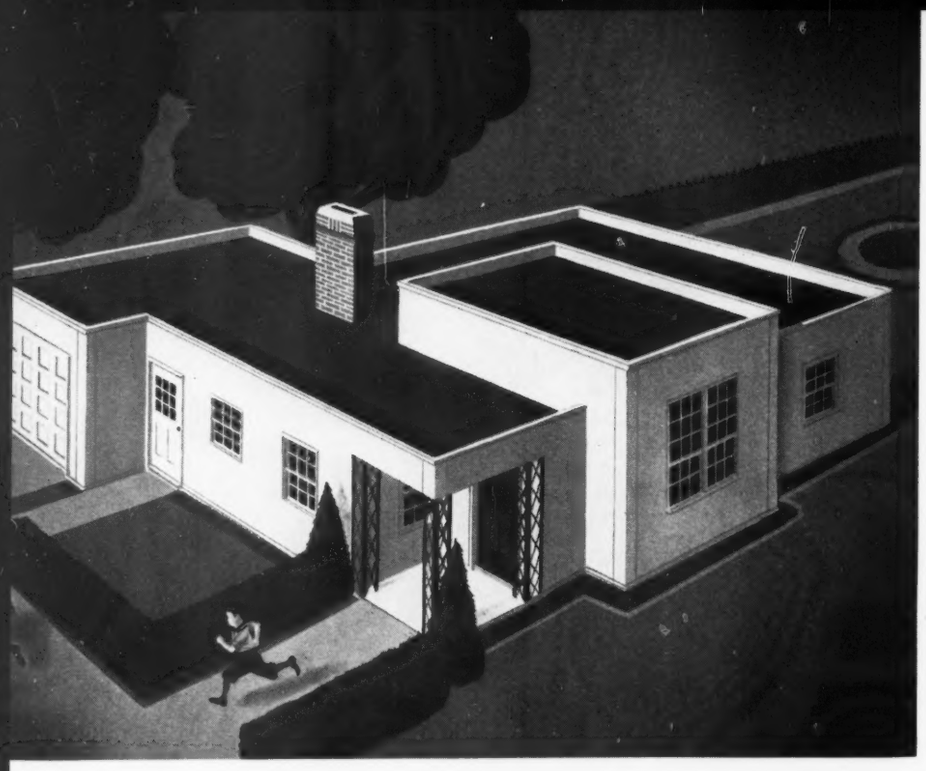


From left to right—Detail of motor box alongside of fan in pent house. Connection between main duct and fan above on roof showing canvas collars and framing. Fan housing and detail of access door with air tight lining. Fans stand in pent houses.



Houses of Steel

Is the pre-fabricated steel house the fore-runner of a tremendously large new activity for our industry? Or is it just another dream of those restive souls who must always "be different." The answer, we think, is that the steel house must sacrifice something to architectural precedent but will be a distinct type. Its inherent livableness should make it p o p u l a r. The page facing shows construction and fabrication features of several well-known types of metal houses.

◆

IS the pre-fabricated steel house a one-stock model, like postage stamps or cigarettes?

That's a question people have been asking ever since houses of steel made their debut in the building trades field.

The truth is that metal houses can be made to order, even to a penthouse, if it is desired. Their size and design actually are limited only by the architect's imagination.

To the average American family, steel houses seem to have been beautiful novelties—something like the public's attitude toward the horse and buggy and the automobile. Nevertheless, each day sees the start of a new metal house somewhere in the United States. The trouble has been these homes are so scattered that Mother and Dad and the family have not become steel house conscious. This situation is changing.

These steel homes that are going up day after day are serving as missionaries in a pioneer field. It is a market that competent observers believe will expand tremendously when a concerted drive by the Federal Housing Administration gets under way in the spring of 1936.

What of prices?

Steel houses can be built in price competition with small or large structures of good frame construction. Equipment and finishings have more to do with the ultimate price than the cost of the steel enclosure. For instance, a three-bedroom bungalow, including winter air conditioning and laundry, just recently was erected in a mid-western city at a cost of $4,500. Of this amount, the total cost of the chassis was less than $2,000.

A variety of plans can be built in the $3,000 to $5,000 price range or, if finances permit, the structure can be of any size with a consequent increase in price. Thus the owner really determines the cost. He can have the exterior painted, shingled, stuccoed, brick veneered—or covered with lustrous porcelain enameled sheets that last a lifetime. Enamel never requires paint and naturally does not have maintenance expense.

The interior of the house, too, presents its opportunities to cut or add to costs. The types of heating equipment, ventilating system, plumbing ware, decorative work and the choice of other equipment that is optional with the builder are determining factors of the total cost.

The prospective builder of a steel house—say a person with $4,000 to $5,000 to spend—will find that he can build an attractive five or six room residence.

While past efforts have been more or less sporadic, there is now a determined and concentrated drive to make available to the general public the values and advantages to be obtained from steel construction.

What are those advantages?

First—immunity from fire. Steel won't burn or melt in the temperature of a normal fire. A family can leave home in the morning with absolute confidence they will have a home when they return in the evening.

Second—people wonder about the danger of lightning. If you live in a steel residence you need not worry. A great electrical wizard said years ago that a steel building is the safest place during an electrical storm. The reason, he said, is simple. The steel walls and roof, properly grounded, shed the force of lightning like a great umbrella sheds rain.

Third—termites are a destructive element eliminated by the steel house. These tiny destroyers of wood have become a serious menace to home owners in many parts of the country. Those who have had personal experience with termites

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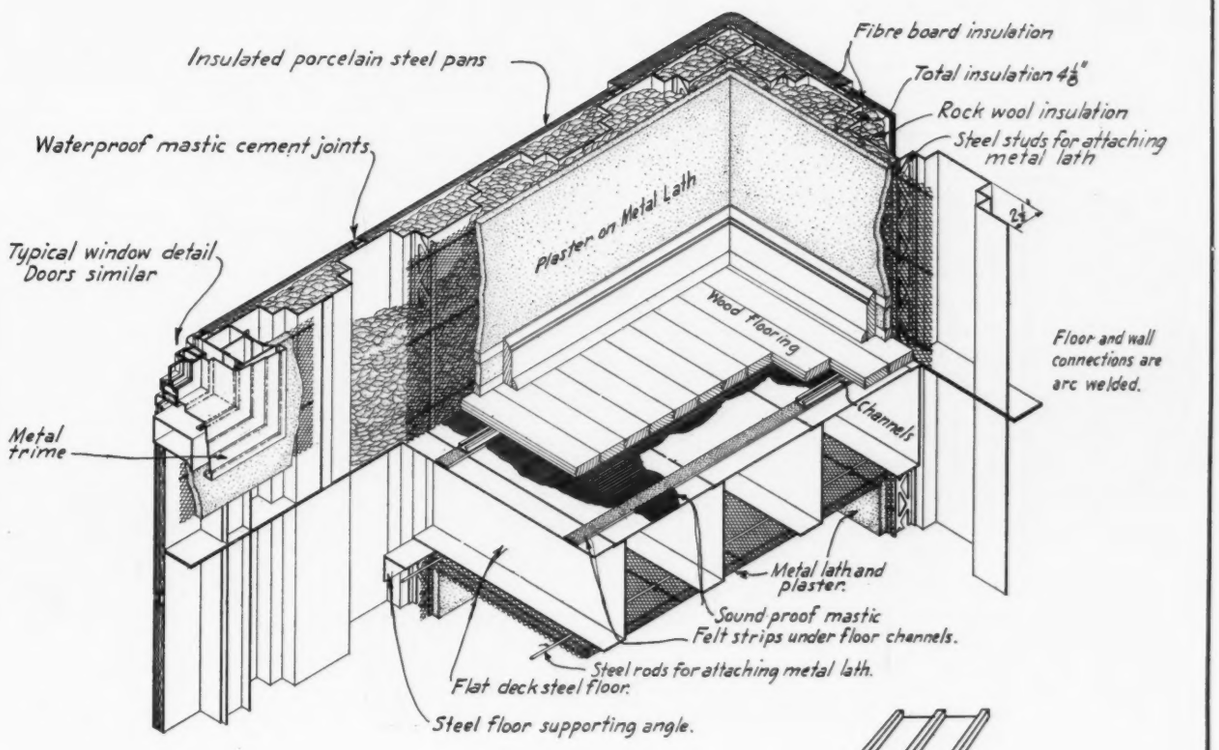
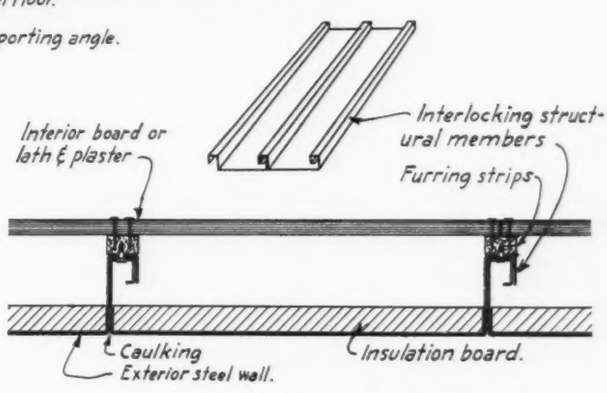
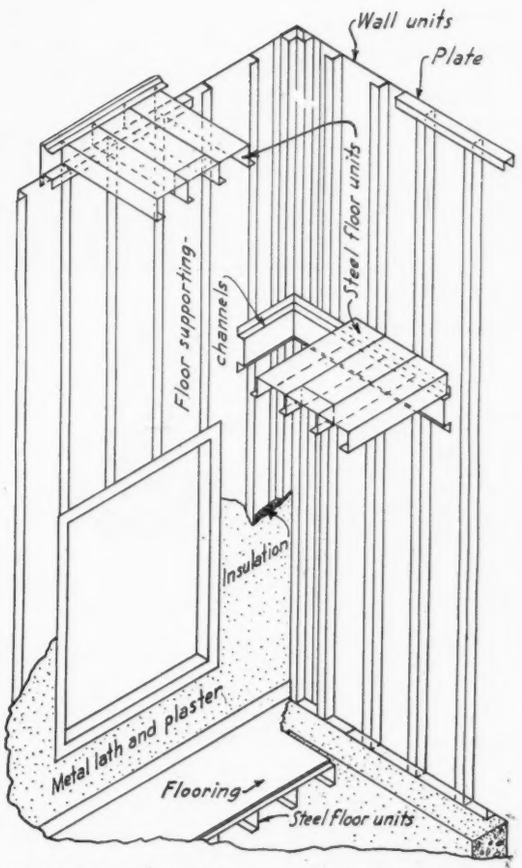
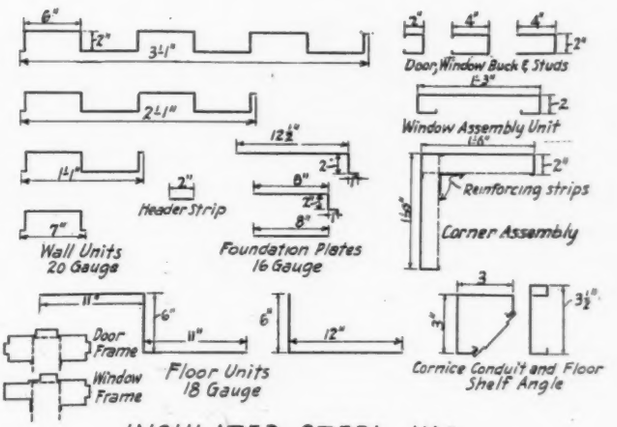




STEELOX WALL

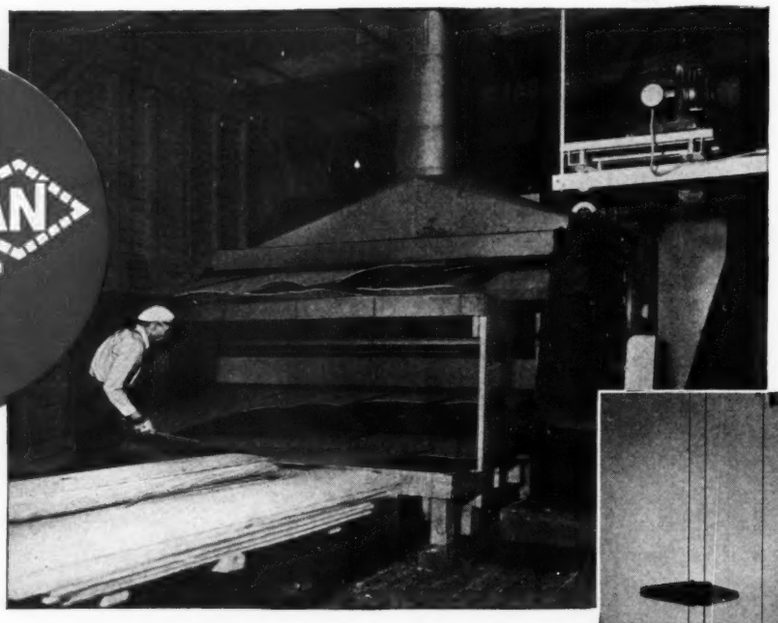


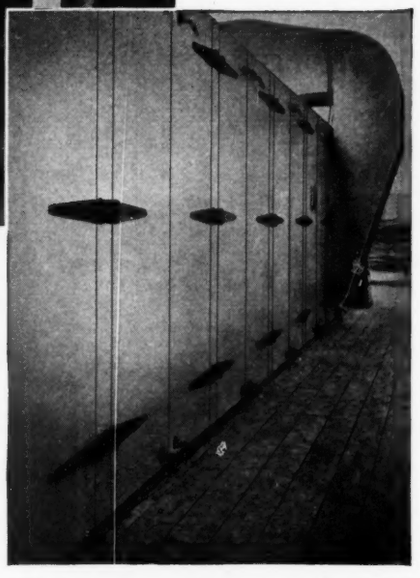
FRAMELESS "DOUBLE STRENGTH" CONSTRUTION
UNIVERSAL HOUSE CORP.



INSULATED STEEL INC.

Are your sheet metal sales to industry profitable?





A few years ago, a prominent western lumber company encountered serious corrosion trouble. Resin and creosote vapors given off by the wood quickly corroded and caused early failure of the dryer doors and ducts.

There was but one thing to do—find an economical material that would resist corrosion—so they turned to Toncan Copper Molybdenum Iron—the alloy of refined open hearth iron, copper and molybdenum with the highest rust-resistance of any ferrous material in its price class.

As has been the experience of thousands of users of Toncan Iron, they found that it lasted three to four times longer than the metal they had been using. In fact, they were so well pleased that they specified Toncan Iron outright for a new dryer recently installed.

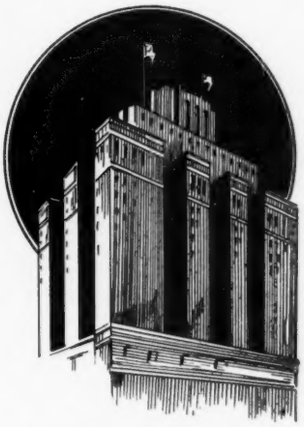
That's how Toncan Iron builds good-will for contractors who stock and recommend it—brings repeat business—and makes your sheet metal sales to industry profitable.

REPUBLIC STEEL

Republic Steel
CORPORATION
GENERAL OFFICES · · · · · CLEVELAND, OHIO

AMERICAN ARTISAN

SHOW SECTION



At the Stevens Hotel—the annual convention of the National Warm Air Heating and Air Conditioning Association

Fourth International Heating and Ventilating Exposition January 27 to 31

This week, the biggest in our industry, with conventions of the National Warm Air Heating and Air Conditioning Assn., the American Society of Heating and Ventilating Engineers and the Exposition, provides educational opportunities few readers will want to miss.

This special "Show Section" presents complete details of all activities of the week.

At the International Amphitheater — the Fourth International Heating and Ventilating Exposition

Exposition, Conventions Make "Big Week" in Chicago

THE week of January 27 to 31 bids for the distinction of being the biggest and most important in the history of our industry with a three-way presentation of equipment, technical and business developments in the form of the 4th International Heating and Ventilating Exposition, the 23rd annual convention of the National Warm Air Heating and Air Conditioning Association and the 42nd annual meeting of the American Society of Heating and Ventilating Engineers—all going on in Chicago at that time.

The Exposition, being held at Chicago's new International Amphitheater, has attracted close to three hundred manufacturers who are exhibiting their new and improved lines of equipment for heating, ventilating and air conditioning systems for everything from the home to the large building and industrial plant. A large number of these manufacturers are displaying the latest developments in air conditioning furnace units, blower-filter units, cooling units, automatic firing devices, combination furnace-burner units, fans, blowers, automatic controls, sheet metal, special ducts and fittings, insulation and other products essential to modern residential heating and air conditioning. A list of those exhibiting and a classification of those showing equipment of particular interest to readers of AMERICAN ARTISAN can be found on succeeding pages.

The Exposition opens at 2:00 P. M., Monday, January 27, and runs until 10:30 P. M. each day until Friday, the 31st, starting at 12:00 noon every day after Monday. The map on a following page shows the most direct transportation routes to the amphitheater. The diagram of the exhibit hall shows the location of each booth.

At the Stevens Hotel, opening Wednesday morning, January 29, is the convention of the National Warm Air Heating and Air Conditioning Association. As can be noted from the accompanying program, the sessions on Wednesday and Thursday mornings and the joint session with the American Society of Heating and Ventilating Engineers on Wednesday afternoon offer papers of outstanding value on research, technical and merchandising subjects.

Similarly, sessions of the American Society of Heating and Ventilating Engineers on Tuesday, Wednesday and Thursday mornings at the Palmer House are devoted to technical papers on significant, timely developments in the industry.

The "Warm Air" group and the A. S. H. V. E. are combining entertainment functions in a get-together luncheon on Tuesday and the annual banquet of the Society on Wednesday night.

THIS WEEK AT A GLANCE

EVENTS: 4th International Heating, Ventilating and Air Conditioning Exposition.
42nd Annual Meeting American Society of Heating and Ventilating Engineers.
23rd Annual Convention National Warm Air Heating and Air Conditioning Association.

PLACE: Chicago.
Exposition—International Amphitheater, 42nd and Halsted Streets.
N.W.A.H.A.C. Assn.—Stevens Hotel.
A.S.H.V.E.—Palmer House.

TIME: Exposition—Opens 2:00 p. m., Monday, January 27, and 12 Noon other days. Closes 10:30 p. m. each evening, January 27-31.
N.W.A.H.A.C. Assn.—Technical sessions Wednesday and Thursday mornings. Joint session with A.S.H.V.E. Wednesday afternoon.
A.S.H.V.E.—Technical Sessions Tuesday, Wednesday and Thursday mornings, 9:30 to 12:30. Joint session Wednesday afternoon with N.W.A.H.A.C. Association.

Program - 23rd Annual Convention - N. W. A. H. A. C. Ass'n

TUESDAY - January 28

For Meeting Rooms See Hotel Lobby Bulletin

Research Advisory Committee.....10:00 A. M.
Technical Education Committee.....10:00 A. M.
Board of Directors..... 8:00 P. M.
Installation Codes Committee.....Hour to be announced
Furnace Manufacturers Industry Meeting..... 2:00 P. M.

TUESDAY 12:30 P. M.

Luncheon American Society of Heating and Ventilating Engineers, Palmer House. Our members are cordially invited.

Note—The Society Convention dates are January 27-31. Place, Palmer House.

WEDNESDAY MORNING - January 29

President, H. T. RICHARDSON, Chairman

8:30—Registration starts
Please register—there is no charge
10:00—Call to Order and Announcements
Our President's Message
H. T. Richardson, New York
10:30—Federal Housing Administration — Recent Developments and Progress Made
A. O. Eberhart
Federal Housing Administration
11:00—Insulation, Why and How
J. D. Hoffman, Purdue University
11:30—The Application of Gas to Warm Air Heating Systems
H. B. Johns
Peoples Gas, Light and Coke Company
Chicago
12:00—RECESS

WEDNESDAY AFTERNOON - January 29

2:00—Joint Meeting of the American Society of Heating and Ventilating Engineers, and National Warm Air Heating and Air Conditioning Association
CHAIRMEN—
John Howatt, President A.S.H.V.E.
H. T. Richardson, President N.W.A.H.&A.C. Association
Room Surface Temperature of Glass in Windows
J. E. Emswiler—W. C. Randall, A.S.H.V.E.
Outline of the A.S.H.V.E. Research
A. P. Kratz, Committee Chairman
Research Advisory Committee Report,
N.W.A.H.&A.C. Association
F. G. Sedgwick, Chairman, Minneapolis
Progress Report on Residence Cooling Using Water from City Service Mains
S. Konzo, Special Research Associate
University of Illinois
5:00—RECESS

WEDNESDAY EVENING - January 29

7:00

7:00—American Society of Heating and Ventilating Engineers' Banquet, Red Lacquer Room — Palmer House

The A.S.H.V.E. graciously extends to all attending our Convention a most cordial invitation to be present. This event includes a delightful repast, some very special features and dancing to the strains of a marvelous orchestra. Tickets may be secured at our Registration Desk, Stevens Hotel; also at the Society's Registration Headquarters, Palmer House and Exposition Booth 8.

THURSDAY, January 30

Vice-President, W. L. RYBOLT, Chairman

9:30—Installation Codes Committee Report
J. D. Hoffman, Chairman
10:00—Merchandising in Our Industry
L. R. Taylor, Utica, N. Y.
10:30—The Combination Furnace Heating and Cooling Plant
Platte Overton, Chicago
11:00—The Bituminous Coal Industry's Program of Research in Domestic Heating
Ralph A. Sherman, Battelle Memorial Institute, Columbus, O.
11:30—Report of Board of Directors and Committees
11:50—New and Unfinished Business—Open Forum
12:15 Noon—Election of Officers
12:30—Final Adjournment — permitting additional time at the Exposition.

Program - 42nd Annual Meeting - A. S. H. & V. E.

January 27—Monday

10:00 a. m.—Greetings—President John Howatt.
Reports of Officers.
Reports of Special Committees:
Committee on Research, Prof. A. P. Kratz, Chairman.
Guide Publication Committee, Prof. G. L. Larson, Chairman.
Committee on Ventilation Standards, W. H. Driscoll, Chairman.

2:00 p. m.—Opening of the Fourth International Heating and Ventilating Exposition — International Amphitheater, 42nd and Halsted Streets.

January 28—Tuesday

9:30 a. m.—Technical Session—Red Lacquer Room.
Call to Order, by President John Howatt.
Welcome to Chicago — Hon. Edw. J. Kelly, Mayor of Chicago.
Thermal Proprieties of Concrete Construction —F. B. Rowley, A. B. Algren and Clifford Carlson.
Comparative Study of Combustion Results with Various Thermostats—B. E. Shaw.
Fuel Saving Resulting from the Use of Storm Windows and Doors—A. P. Kratz and S. Konzo.

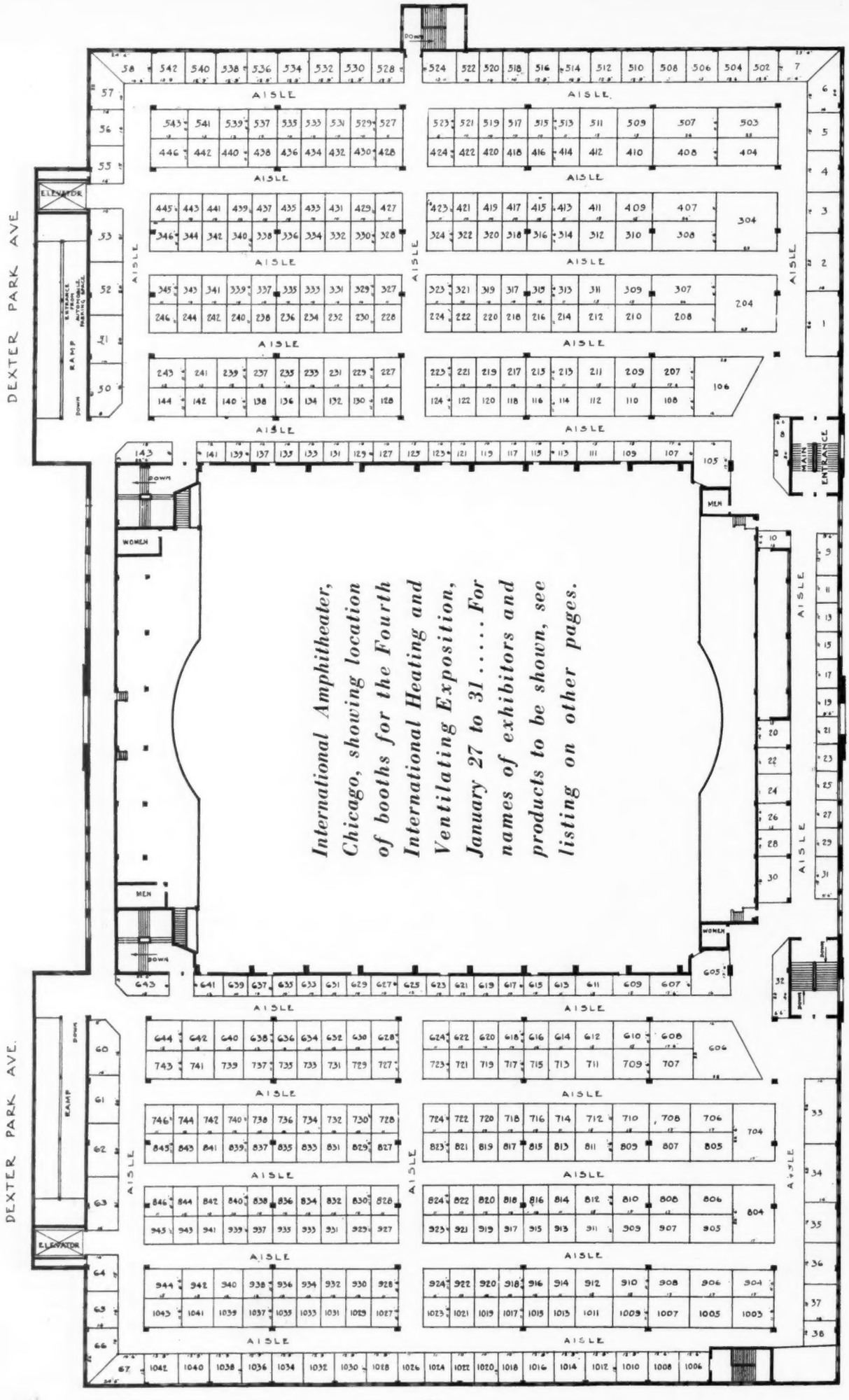
January 29—Wednesday

9:30 a. m.—Technical Session—Red Lacquer Room.
Performance of Fin-Tube Units for Air Heating, Cooling and Dehumidifying—G. L. Tuve.
Subjective Reactions of Human Beings to Certain Outdoor Atmospheric Conditions — C.E.A. Winslow and L. P. Herrington.
Ventilation Requirements—C. P. Yaglou, E. C. Riley and D. I. Coggins.
Airfoil Fan Characteristics—W. A. Rowe.

2:00 p. m.—Warm Air Heating and Cooling Session with **National Warm Air Heating and Air Conditioning Association** at Stevens Hotel.
Room Surface Temperature of Glass in Windows—J. E. Emswiler and W. C. Randall.

January 30—Thursday

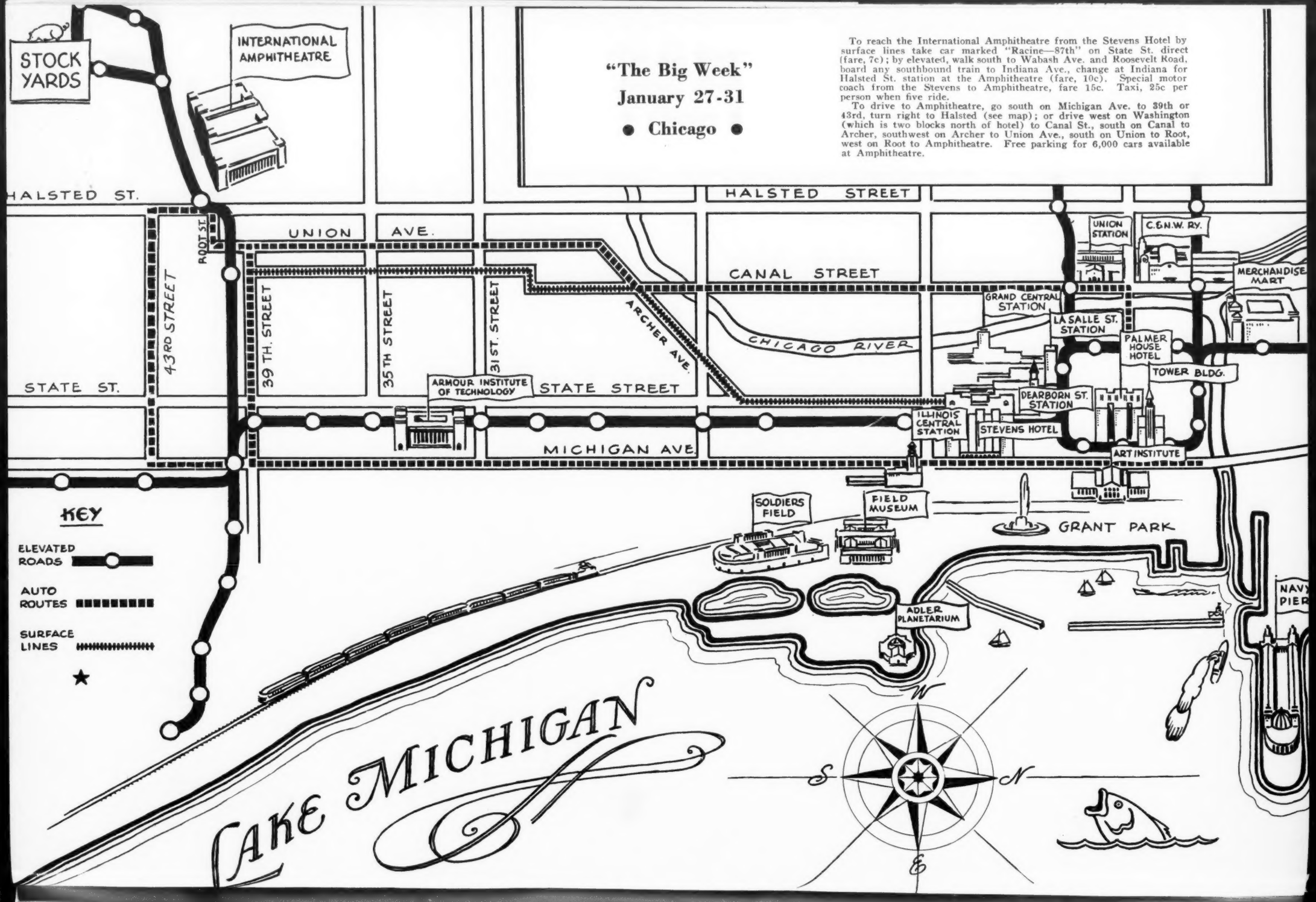
9:30 a. m.—Technical Session—Red Lacquer Room.
Comfort Standards for Summer Air Conditioning—F. C. Houghten and Carl Gutberlet.
Corrosion Studies in Steam Heating Systems —R. R. Seeber, F. A. Rohrman and G. E. Smedberg.


DEXTER PARK AVE.
SOUTH HALSTED ST.
AISLE
RAMP
ELEVATOR
MEN
WOMEN
MAIN ENTRANCE
DOWN
International Amphitheater, Chicago, showing location of booths for the Fourth International Heating and Ventilating Exposition, January 27 to 31 . . . . . For names of exhibitors and products to be shown, see listing on other pages.

Chicago from Lake Michigan

List of Exhibition Exhibitors

Name of Exhibitor	Address	Booth No.
Ace Engineering Co.	Chicago, Ill.	738
A.C.E. Inc.	Chicago, Ill.	235
Adams Engineering Co.	Chicago, Ill.	716
Aerofin Corp.	Newark, N. J.	338
Aerologist, The	Chicago, Ill.	235
Air Controls, Inc.	Cleveland, O.	19-21
Airtherm Mfg. Co.	St. Louis Mo.	11
Alco Valve Co., Inc.	St. Louis, Mo.	11
Allis-Chalmers Mfg. Co.	Milwaukee, Wis.	219-221-223
American Artisan	Chicago, Ill.	322-324
American Blower Corp.	Detroit, Mich.	508
American Brass Co.	New York, N. Y.	421-423
American Gas Accumulator Co.	Newark, N. J.	138
American Gas Association	New York, N. Y.	50-51
American Gas Products Corp.	New York, N. Y.	506
American Radiator Co.	New York, N. Y.	6-7&500
American Rolling Mill Co.	Middletown, O.	238-240
American Sheet & Tin Plate Co.	Pittsburgh, Pa.	52-53
American Society of Heating & Ventilating Engineers	New York, N. Y.	8-10-20
American Steam Pump Co.	Battle Creek, Mich.	706
American Steel & Wire Co.	New York, N. Y.	52-53
American Thermometer Co.	St. Louis, Mo.	710
Anderson Mfg. Co.	Cambridge, Mass.	611
Armstrong Bros. Tool Co.	Chicago, Ill.	129
Armstrong Cork Products Co.	Lancaster, Pa.	246
Armstrong Machine Wks.	Three Rivers, Mich.	115
Automatic Burner Corp.	Chicago, Ill.	512-514
Automatic Heat and Air Conditioning	Chicago, Ill.	125-127
Automatic Products Co.	Milwaukee, Wis.	209
Automatic Valve Corp.	Chicago, Ill.	637
Autovent Fan & Blower Co.	Chicago, Ill.	123
Baker Ice Machine Co.	Omaha, Neb.	134
Baldor Electric Co.	St. Louis, Mo.	142
Barber-Colman Co.	Rockford, Ill.	503
Barnes & Jones, Inc.	Boston, Mass.	131
Beaver Pipe Tools, Inc.	Warren, O.	30
Bell & Gossett Co.	Chicago, Ill.	22-24
Bethlehem Steel Co.	Bethlehem, Pa.	720-722-724
Breuer Electric Mfg. Co.	Chicago, Ill.	519
Brown Instruments Div., Minneapolis - Honeywell Regulator Co.	Philadelphia, Pa.	310-312-314
Bryant Heater Co.	Cleveland, O.	1
Buffalo Forge Co.	Buffalo, N. Y.	543
Burdett Mfg. Co.	Chicago, Ill.	231-233
Burge Ice Machine Co.	Chicago, Ill.	134
Burgess Battery Co., (Acoustic Div.)	Chicago, Ill.	416
Burke Stoker & Mfg. Co.	Chicago, Ill.	344-346
Burnham Boiler Corp.	Irvington, N. Y.	434-436
Carbondale Machine Corp.	Harrison, N. J.	606
Carnegie-Illinois Steel Corp.	Chicago, Ill.	52-53
Carrier Engineering Corp.	Newark, N. J.	338-340-342
Carter Coal Co.	Cincinnati, O.	311
Cashin Co., W. D.	Boston, Mass.	25-27-29
Century Electric Co.	St. Louis, Mo.	210
Century Engineering Corp.	Cedar Rapids, Ia.	528-530
Chace Valve Co., W. M.	Detroit, Mich.	119
Chalmers Oil Burner Co.	Minneapolis, Minn.	738
Chapman Clay Co.	Zanesville, O.	13
Chase Brass & Copper Co.	Waterbury, Conn.	228-230
Chicago Pump Co.	Chicago, Ill.	432
City of Chicago, Board of Health		804-806
City of Chicago, Dept. of Smoke Inspection and Abatement		804-806
Columbia Steel Co.	San Francisco, Cal.	52-53
Commercial Investment Trust, Inc.	New York, N. Y.	61
Cook Electric Co.	Chicago, Ill.	515
Cork Import Corp.	New York, N. Y.	641
Crane Co.	Chicago, Ill.	204
Crowe Nameplate & Mfg. Co.	Chicago, Ill.	816
Cyclone Fence Co.	Waukegan, Ill.	52-53
Dail Steel Products Co.	Lansing, Mich.	15
Dayton Rubber Mfg. Co.	Dayton, O.	427
De La Vergne Engine Co.	Philadelphia, Pa.	33
Delco Appliance Corp.	Rochester, N. Y.	520-522
Detroit Lubricator Co.	Detroit, Mich.	504
Dole Valve Co.	Chicago, Ill.	418
Domestic Engineering	Chicago, Ill.	125-127
Dreis & Krump Mfg. Co.	Chicago, Ill.	742
Dunham Co., C. A.	Chicago, Ill.	428&527-529-531
Eagle-Picher Sales Co.	Cincinnati, O.	212
Economy Pumping Mchy. Co.	Chicago, Ill.	107-109-111
Eddy Stoker Corp.	Chicago, Ill.	643
Electric Air Heater Co., Div. American Foundry Equipment Co.	Mishawaka, Ind.	625
Electrimatic Corp.	Chicago, Ill.	707
Electrol, Inc.	Clifton, N. J.	605
Ellison Draft Gage Co.	Chicago, Ill.	141
Emerson Elec. Mfg. Co.	St. Louis, Mo.	410&509


"The Big Week"
January 27-31
• Chicago •
To reach the International Amphitheatre from the Stevens Hotel by surface lines take car marked "Racine—87th" on State St. direct (fare, 7c); by elevated, walk south to Wabash Ave. and Roosevelt Road, board any southbound train to Indiana Ave., change at Indiana for Halsted St. station at the Amphitheatre (fare, 10c). Special motor coach from the Stevens to Amphitheatre, fare 15c. Taxi, 25c per person when five ride.
To drive to Amphitheatre, go south on Michigan Ave. to 39th or 43rd, turn right to Halsted (see map); or drive west on Washington (which is two blocks north of hotel) to Canal St., south on Canal to Archer, southwest on Archer to Union Ave., south on Union to Root, west on Root to Amphitheatre. Free parking for 6,000 cars available at Amphitheatre.
STOCK YARDS
INTERNATIONAL AMPHITHEATRE
HALSTED ST.
HALSTED STREET
ROOT ST.
UNION AVE.
43RD STREET
39 TH. STREET
35TH STREET
31 ST. STREET
ARCHER AVE.
CANAL STREET
CHICAGO RIVER
STATE ST.
ARMOUR INSTITUTE OF TECHNOLOGY
STATE STREET
MICHIGAN AVE.
UNION STATION
C.G.N.W. RY.
MERCHANDISE MART
GRAND CENTRAL STATION
LA SALLE ST. STATION
PALMER HOUSE HOTEL
TOWER BLDG.
DEARBORN ST. STATION
ILLINOIS CENTRAL STATION
STEVENS HOTEL
ART INSTITUTE
SOLDIERS FIELD
FIELD MUSEUM
GRANT PARK
ADLER PLANETARIUM
NAVY PIER
KEY
ELEVATED ROADS
AUTO ROUTES
SURFACE LINES
LAKE MICHIGAN
W
S
N
E

Exhibitors [Continued]

Name of Exhibitor	Address	Booth No.
Enterprise Boiler & Tank Wks.	Chicago, Ill.	642
Evans Corp., Geo.	Moline, Ill.	624
Excelsior Steel Furnace Co.	Chicago, Ill.	736
Excelso Products Corp.	Buffalo, N. Y.	7&502
Fairbanks, Morse & Co.	Chicago, Ill.	239&140
Fedders Mfg. Co., Inc.	Buffalo, N. Y.	610
Federal Housing Administration		
Fee and Stemwedel, Inc.	Chicago, Ill.	135
Fireline Stove & Furnace Lining Co.	Chicago, Ill.	113
Fitzgibbons Boiler Co., Inc.	New York, N. Y.	307
Fox Furnace Co.	Elyria, O.	4-5
Frick Co., Inc.	Waynesboro, Pa.	128
Friez & Sons, Inc., Julien P.	Baltimore, Md.	320
Frigidaire Corp.	Dayton, O.	441-443-445
Fuel Oil Journal	New York, N. Y.	333-335
Furblo Co.	Hermansville, Mich.	536
Garden City Fan Co.	Chicago, Ill.	517
Gaskoal Corp.	Chicago, Ill.	640
General Electric Co., Air Conditioning Dept.	Bloomfield, N. J.	2
General Electric Co., Oil Burner Dept.	Bloomfield, N. J.	2
Gilbert & Barker Mfg. Co.	Springfield, Mass.	709-711
Grinnell Company, Inc.	Providence, R. I.	25-27-29
Hardinge Oil Burner Co.	Chicago, Ill.	9
Hart & Cooley Mfg. Co.	Chicago, Ill.	309
Health Air Systems, Inc.	Detroit, Mich.	60
Heating & Ventilating	New York, N. Y.	224
Heating, Piping and Air Conditioning	Chicago, Ill.	322-324
Heil Co.	Milwaukee, Wis.	207
Henry Furnace & Fdry. Co.	Cleveland, O.	708
Henry Valve Co.	Chicago, Ill.	627
Henszey De-Concentrator Co.	Watertown, Wis.	13
Hess Warming & Ventilating Co.	Chicago, Ill.	628
Hexcel Radiator Co.	Racine, Wis.	17
Himelblau, Byfield & Co.	Chicago, Ill.	11-13-15
Hoffman Specialty Co., Inc.	New York, N. Y.	107-109-111
Holcomb & Hoke Mfg. Co.	Indianapolis, Ind.	712-714
Holtzer-Cabot Electric Co.	Boston, Mass.	241
Hotstream Heater Co.	Cleveland, O.	136
Howe Ice Machine Co.	Chicago, Ill.	23
Ilg Electric Ventilating Co.	Chicago, Ill.	124
Illinois Engineering Co.	Chicago, Ill.	321-323
Illinois Iron & Bolt Co.	Chicago, Ill.	728
Illinois Testing Laboratories, Inc.	Chicago, Ill.	419
Imperial Brass Mfg. Co.	Chicago, Ill.	337
Independent Register Co.	Cleveland, O.	318
Ingersoll-Rand Co.	New York, N. Y.	446
Iron Fireman Mfg. Co.	Cleveland, O.	308
Iroquois Coal Co.	Indianapolis, Ind.	712-714
Jenkins Bros.	New York, N. Y.	214-216
Johanson Water Heater Co.	Chicago, Ill.	139
Johns-Manville	New York, N. Y.	110
Johnson Co., S. T.	Oakland, Cal.	510
Johnson Service Co.	Milwaukee, Wis.	521-523
Joliet Heating Corp.	Joliet, Ill.	638
Jones & Laughlin Steel Corp.	Pittsburgh, Pa.	208
Kainer & Co.	Chicago, Ill.	415
Keasbey & Mattison Co.	Ambler, Pa.	437
Keeney Publishing Co.	Chicago, Ill.	322-324
Kelvinator Corp.	Detroit, Mich.	55-56-57
Kewanee Boiler Corp.	Kewanee, Ill.	502-504
Kleen-Heet, Inc.	Chicago, Ill.	512-514
Korfund Co.	Long Island City, N. Y.	13
Lamneck Products, Inc.	Columbus, O.	237
Lau Heating Service, Inc.	Dayton, O.	313
Lennox Furnace Co.	Marshalltown, Ia.	633-635
Maid-O'-Mist, Inc.	Chicago, Ill.	137
Marsh Corp., Jas. P.	Chicago, Ill.	120-122
May Oil Burner Corp.	Baltimore, Md.	532-534
McCord Radiator & Mfg. Co.	Detroit, Mich.	417
McDonnell & Miller	Chicago, Ill.	524
Mercoid Corp.	Chicago, Ill.	328-330
Meyer Furnace Co.	Peoria, Ill.	339
Midwest Piping & Supply Co.	St. Louis, Mo.	13
Milwaukee Valve Co.	Milwaukee Wis,.	316
Minneapolis,Honeywell Regulator Co.	Minneapolis, Minn.	310-312-314
Modine Mfg. Co.	Racine, Wis.	227-229
Monarch Mfg. Wks., Inc.	Philadelphia, Pa.	618
Motor Wheel Corp., Heater Division	Lansing, Mich.	334-336
Mueller Brass Co.	Port Huron, Mich.	143
Mueller Furnace Co., L. J.	Milwaukee, Wis.	408
National Radiator Corp.	Johnstown, Pa.	31
National Regulator Co.	Chicago, Ill.	242
National Sheet Metal Contractor	Chicago, Ill.	616
National Tube Co.	Pittsburgh, Pa.	52-53
Nelson Corp., Herman	Moline, Ill.	130-132
Nesbitt, Inc., John J., & Buckeye Blower Co.	Philadelphia, Pa.	404
Norge Corp.	Detroit, Mich.	721-723
Oil Burner Builders	Rock Island, Ill.	732
Oil Heat	New York, N. Y.	332
Owens-Illinois Glass Co.	Newark, O.	108
Peerless Electric Co.	Warren, O.	244
Penn Electric Switch Co.	Des Moines, Ia.	218-220
Peoples Gas Light and Coke Co.	Chicago, Ill.	50-51
Peoples Oil Burner Co.	Chicago, Ill.	609
Perfex Controls Co.	Milwaukee, Wis.	541
Perfex Radiator Co.	Milwaukee, Wis.	541
Petroleum Heat and Power Co.	Stamford, Conn.	629-631
Petrometer Corp.	Long Island City, N. Y.	533
Plibrico Jointless Firebrick Co.	Chicago, Ill.	115
Plumbing & Heating Trade Journal	New York, N. Y.	439
Powers Regulator Co.	Chicago, Ill.	317-319
Practical Instrument Co.	Chicago, Ill.	609
Radiant Products, Inc.	Akron, O.	713
Railway Utility Co.	Chicago, Ill.	630
Randall Graphite Prod. Corp.	Chicago, Ill.	610
Refrigeration & Air Conditioning Institute	Chicago, Ill.	619
Rega Mfg. Co.	Rochester, N. Y.	621

Exhibitors [Continued]

Name of Exhibitor	Address	Booth No.
Republic Steel Corp.	Massillon, O.	438-440-442
Research Laboratory, A. S. H. & V. E.	Pittsburgh, Pa.	10
Richardson & Boynton Co.	New York, N. Y.	106
Ric-wiL Co.	Cleveland, O.	133-135
Ridge Tool Co.	Elyria, O.	32
Rochester Mfg. Co., Inc.	Rochester, N. Y.	613
Ruberoid Co.	New York, N. Y.	636
Russell Electric Co.	Chicago, Ill.	407
Sangamo Electric Co.	Springfield, Ill.	430
Sarco Co., Inc.	New York, N. Y.	144
Scully Steel Products Co.	Chicago, Ill.	52-53
Sheet Metal Worker	New York, N. Y.	737
Silent Glow Oil Burner Corp.	Hartford, Conn.	105
Silvercote Products, Inc.	Chicago, Ill.	632
Sims Co.	Erie, Pa.	706
Snips Magazine	Chicago, Ill.	
Spencer Thermostat Co.	Attleboro, Mass.	730
Standard Galvanizing Co.	Chicago, Ill.	824
Standard Lime & Stone Co.	Baltimore, Md.	622
Stannard Power Equipment Co.	Chicago, Ill.	617
Steel & Tubes, Inc.	Cleveland, O.	217
Sterling Engineering Co.	Milwaukee, Wis.	537
Stevens-Root Co.	Chicago, Ill.	117
Streamline Pipe & Fittings Co., Division of Mueller Brass Co.	Port Huron, Mich.	143
Sturtevant Co., B. F.	Boston, Mass.	327
Sundstrand Machine Tool Co.	Rockford, Ill.	744
Sundstrand Sales Co.	Rockford, Ill.	731
Surface Combustion Corp.	Toledo, O.	232-234-236
Syncro-Flame Burner Corp.	Hartford, Conn.	728
Taco Heaters, Inc.	New York, N. Y.	507
Tennessee Coal, Iron & Railroad Co.	Birmingham, Ala.	52-53
Thermal Units Mfg. Co.	Chicago, Ill.	607
Thrush & Co., H. A.	Peru, Ind.	511
Timken Silent Automatic Co.	Detroit, Mich.	341-343-345
Tork Clock Co., Inc.	Mount Vernon, N. Y.	734
Trerice Co., H. O.	Detroit, Mich.	639
Turney Corp.	Muskegon, Mich.	13
Tuttle & Bailey, Inc.	New Britain, Conn.	412
Uni-Flo Corp.	Rockford, Ill.	503
United States Radiator Corp.	Detroit, Mich.	414&513
United States Register Co.	Battle Creek, Mich.	315
United States Steel Corp.	New York, N. Y.	52-53
Viking Mfg. Co.	Akron, O.	713
Viking Pump Co.	Cedar Falls, Ia.	718
Vilter Mfg. Co.	Milwaukee, Wis.	26-28
Waterfilm Boilers, Inc.	Jersey City, N. J.	614
Waterloo Register Co.	Waterloo, Ia.	623
Waterman-Waterbury Co.	Minneapolis, Minn.	608
Watts Regulator Co.	Lawrence, Mass.	118
Wayne Oil Burner Corp.	Fort Wayne, Ind.	243
Webster & Co., Warren	Camden, N. J.	304
Webster Electric Co.	Racine, Wis.	329-331
Weil-McLain Co.	Chicago, Ill.	409-411-413
Weil Pump Co.	Chicago, Ill.	121
Westinghouse Electric & Mfg. Co., Air Conditioning Div.	Mansfield, O.	433-435
Westinghouse Electric & Mfg. Co.	E. Pittsburgh, Pa.	429-431
White Mfg. Co.	St. Paul, Minn.	746
Whiting Corp.	Harvey, Ill.	539
Whittington & Co., W. P.	Indianapolis, Ind.	706
Wilbin Instrument Corp.	New York, N. Y.	627
Williams Oil-O-Matic Heating Corp.	Bloomington, Ill.	34
Wilson & Co., Inc.	Chicago, Ill.	535
Wood Conversion Co.	St. Paul, Minn.	416
Wood Industries, Inc., Gar.	Detroit, Mich.	516-518
Worthington Pump & Machy. Corp.	Harrison, N. J.	606
York Ice Machinery Corp.	York, Pa.	112-114-116&211-213-215
York Oil Burner Co., Inc.	York, Pa.	538-540
Young Radiator Co.	Racine, Wis.	222
Youngstown Sheet & Tube Co.	Youngstown, O.	420-422-424

Field Museum

Exhibits Classified by Products

On these pages are classified products of interest to those engaged in warm air heating and residential air conditioning work under each of which is listed the manufacturers who are displaying this equipment at the Exposition. The booth number of each manufacturer may be found in the foregoing list of exhibitors and the location of each booth may be found on the diagram of the hall.

Many new products are being shown for the first time at this Exposition. Much of the equipment is displayed in actual operation. Available advance information on such new products and on such operating exhibits is given herewith. Inspection of every booth is recommended, however. AMERICAN ARTISAN is in Booths 322-324 and any additional information desired will be gladly given to all visitors.

AIR CONDITIONERS, ROOM TYPE

Carrier Engineering Corp.
Fairbanks, Morse & Co.
Frigidaire Corp.
General Electric Co.
Kelvinator Corp.
Nelson Corp., Herman
Norge Corp.
Westinghouse Electric & Mfg. Co.
Williams Oil-O-Matic Heating Corp.
York Ice Machinery Corp.

AIR CONDITIONING BOILER UNITS

American Blower Corp.
American Radiator Co.
Bryant Heater Co.
General Electric Co.
Gilbert & Barker Mfg. Co.
Nelson Corp., Herman
Petroleum Heat & Power Co.
Timken Silent Automatic Co.
Weil-McLain Co.
Williams Oil-O-Matic Heating Corp.
Wood Industries, Inc., Gar
York Oil Burner Co., Inc.

AIR CONDITIONING FURNACE UNITS

Bryant Heater Co.
Carrier Engineering Corp.
Century Engineering Corp.
Dail Steel Products Co.
Delco Appliance Corp.
Enterprise Boiler & Tank Wks.
Evans Corp., Geo.
Excelsior Steel Furnace Co.
Fox Furnace Co.
General Electric Co.
Hardinge Oil Burner Co.
Health-air Systems, Inc.
Henry Furnace & Foundry Co.
Hess Warming & Ventilating Co.
Joliet Heating Corp.
Lennox Furnace Co.
Meyer Furnace Co.
Mueller Furnace Co., L. J.
Nelson Corp., Herman
Timken Silent Automatic Co.
Waterman-Waterbury Co.
Wayne Oil Burner Corp.
Wood Industries, Inc., Gar
York Oil Burner Co., Inc.

AIR FILTERS

American Radiator Co.
Owens-Illinois Glass Co.
Russell Electric Co.
Wilson & Co., Inc.

AIR WASHERS

Buffalo Forge Co.

BEARINGS, PILLOW BLOCKS

Randall Graphite Products Corp.

BELTS AND TRANSMISSION DRIVES

Allis Chalmers Mfg. Co.
Dayton Rubber Co.
Worthington Pump & Machinery Corp.

BLOWER-FILTER UNITS

Air Controls, Inc.
Furblo Co.
Lau Heating Service, Inc.
Mueller Furnace Co., L. J.
Peerless Electric Co.
Russell Electric Co.
Waterman-Waterbury Co.

Introducing for the first time at this show . . . New air conditioners by **American Radiator Co.**, New York, N. Y. . . . The world's largest stainless steel polished sheet, 84-90 in., mirror finish, by **American Rolling Mill Co.**, Middletown, O. . . . New propeller fan embodying a non-overloading power feature by **Autovent Fan & Blower Co.**, Chicago, Ill. . . . A new oil-immersed damper control motor rated at 1,000 lb.-in. torque by **Barber-Colman Co.**, Rockford, Ill. . . . A new type thermostat by **Detroit Lubricator Co.**, Detroit, Mich. . . . A new asbestos cement for setting up furnaces, stoves and retorts by **Fireline Stove & Furnace Lining Co.**, Chicago, Ill. . . . A coal-burning and a gas-fired air conditioning furnace unit by **Fox Furnace Co.**, Elyria, O. . . . Effective temperature control instruments; a "windowstat," an instrument which provides protection against window condensation during cold weather; and a new hand-aspirated psychrometer by **Julian P. Friez & Sons, Inc.**, Baltimore, Md. . . . A completely automatic coal burning heating plant, using pulverized coal, by **Gaskoal Corp.**, Chicago, Ill. . . . A portable electric humidifier and a portable electric room heater by **Hexcel Radiator Co.**, Racine, Wis. . . . A new duct jet for direct reading air velocity meter by **Illinois**

BOILER-BURNER UNITS

American Radiator Co.
Automatic Burner Corp.
Century Engineering Corp.
Crane Co.
Delco Appliance Corp.
General Electric Co.
Gilbert & Barker Mfg. Co.
Hardinge Oil Burner Co.
Heil Co.
Johnson Co., S. T.
Kelvinator Corp.
Kewanee Boiler Corp.
Kleen-Heet, Inc.
Motor Wheel Corp.
National Radiator Corp.
Nelson Corp., Herman
Petroleum Heat & Power Co.
Timken Silent Automatic Co.
Wayne Oil Burner Corp.
Williams Oil-O-Matic Heating Corp.
Wood Industries, Inc., Gar
York Oil Burner Co., Inc.

CEMENTS, REFRACTORIES, FURNACE LININGS

Chapman Clay Co.
Eagle-Picher Sales Co.
Fireline Stove & Furnace Lining Co.
Plibrico Jointless Firebrick Co.
Standard Lime & Stone Co.

CLEANERS, FURNACE VACUUM

Breuer Electric Co.

COILS, COOLING AND HEATING SURFACE

Aerofin Corp.
Howe Ice Machine Co.
McCord Radiator & Mfg. Co.
Modine Mfg. Co.
Nesbitt, Inc., John J.
Standard Galvanizing Co.
Young Radiator Co.

CONTROLS

Automatic Products Co.
Barber-Colman Co.
Cook Electric Co.
Detroit Lubricator Co.
Friez & Sons, Inc., Julien P.
Johnson Service Co.
Mercoid Corp.
Minneapolis-Honeywell Regulator Co.
National Regulator Co.
Penn Electric Switch Co.
Perfex Controls Co.
Powers Regulator Co.
Russell Electric Co.
Sangamo Electric Co.
Spencer Thermostat Co.
Tork Clock Co., Inc.
White Mfg. Co.
Wilbin Instrument Corp.

COOLING UNITS

Baker Ice Machine Co.
Carbondale Machine Corp.
Carrier Engineering Corp.
Fairbanks, Morse & Co.
Fedders Mfg. Co., Inc.
Frick Co., Inc.
Frigidaire Corp.
General Electric Co.
Grinnell Co., Inc.
Howe Ice Machine Co.
Ilg Electric Ventilating Co.
Kelvinator Corp.
Thermal Units Mfg. Co.
Vilter Mfg. Co.
Westinghouse Electric & Mfg. Co.
Williams Oil-O-Matic Heating Corp.
York Ice Machinery Corp.
Young Radiator Co.

COPPER TUBE AND FITTINGS

American Brass Co.
American Radiator Co.
Chase Brass & Copper Co.
Mueller Brass Co.
Streamline Pipe & Fittings Co.

DUCTS AND FITTINGS FOR AIR CONDITIONING

American Rolling Mill Co.
Excelsior Steel Furnace Co.
Henry Furnace & Foundry Co.
Lamneck Products, Inc.

Testing Laboratories, Inc., Chicago, Ill. . . . A six-stage air conditioning furnace unit by **Joliet Heating Corp.,** Joliet, Ill. . . . Air-acoustic sheets, a new product developed by **Johns-Manville,** New York, N. Y., for use in quieting ducts of air conditioning systems. . . . Stock factory-made forced air fittings by **Lamneck Products, Inc.,** Columbus, O. . . . New line of blower wheels and housings by **Lau Heating Service, Inc.,** Dayton, O. . . . A humidifier water control by **McDonnell & Miller,** Chicago, Ill. . . . New type oil fired winter air conditioning furnace unit by **Meyer Furnace Co.,** Peoria, Ill. . . . An oil fired air conditioning furnace and a gas-fired boiler by **L. J. Mueller Furnace Co.,** Milwaukee, Wis. . . . First group of new automatic controls for heating, ventilating, air conditioning and refrigeration by **Perfex Controls Co.,** Milwaukee, Wis. . . . A double reservoir, the upper entirely separate from the lower, self aligning, self lubricating pillow block by **Randall Graphite Products Corp.,** Chicago, Ill. . . . A new spray humidifier with new self-cleaning spray nozzle for use with warm air furnaces by **Rega Mfg. Co.,** Rochester, N. Y. . . . A domestic humidifier for installation in the smoke pipe of a warm air furnace by **Rochester Mfg. Co., Inc.,** Rochester, N. Y. . . . New oil burner controls, new stoker controls and a new dehumidifying liquid by **Russell Electric Co.,** Chicago, Ill. . . .

FANS AND BLOWERS, VENTILATING AND AIR CONDITIONING

Air Controls, Inc.
American Blower Corp.
Autovent Fan & Blower Co.
Buffalo Forge Co.
Emerson Electric Mfg. Co.
Garden City Fan Co.
Ilg Electric Ventilating Co.
Meyer Furnace Co.
Peerless Electric Co.
Russell Electric Co.
Sturtevant Co., B. F.

FURNACE FANS AND BLOWERS

Air Controls, Inc.
American Blower Corp.
Autovent Fan & Blower Co.
Buffalo Forge Co.
Emerson Electric Mfg. Co.
Furblo Co.
Lau Heating Service, Inc.
Meyer Furnace Co.
Peerless Electric Co.
Russell Electric Co.
Sturtevant Co., B. F.

FURNACES, COAL, GAS OR OIL FIRED

Dail Steel Products Co.
Enterprise Boiler & Tank Wks.
Excelsior Steel Furnace Co.
Fox Furnace Co.
Henry Furnace & Foundry Co.
Hess Warming & Ventilating Co.
Joliet Heating Corp.
Lennox Furnace Co.
Meyer Furnace Co.
Motor Wheel Corp.
Mueller Furnace Co., L. J.
Richardson & Boynton Co.
Surface Combustion Corp.
Timken Silent Automatic Co.
Waterman-Waterbury Co.
York Oil Burner Co., Inc.

HUMIDIFIERS

Bryant Heater Co.
Maid-O-Mist, Inc.
McDonnell & Miller.
Rega Mfg. Co.
Rochester Mfg. Co., Inc.
Turney Corp.

INSTRUMENTS, INDICATING, RECORDING AND TESTING

A. C. E., Inc.
American Thermometer Co.
Brown Instrument Co.
Ellison Draft Gage Co.
Fee & Stemwedel, Inc.
Friez & Sons, Inc., Julien P.
Illinois Testing Laboratories, Inc.
Minneapolis-Honeywell Regulator Co.
Petrometer Corp.
Practical Instrument Co.
Trerice Co., H. O.

INSULATION AND ACOUSTICAL MATERIALS

Armstrong Cork Products Co.
Burgess Battery Co.
Cork Import Corp.
Eagle-Picher Sales Co.
Johns-Manville
Keasbey & Mattison Co.
Korfund Co.
Ruberoid Co.
Standard Lime & Stone Co.
Wilson & Co., Inc.
Wood Conversion Co.

MOTORS

Allis-Chalmers Mfg. Co.
Baldor Electric Co.
Century Electric Co.
Emerson Electric Mfg. Co.
Fairbanks, Morse & Co.
General Electric Co.
Holtzer-Cabot Co.
Peerless Electric Co.
Russell Electric Co.
Westinghouse Electric & Mfg. Co.

NOZZLES, SPRAY

Monarch Mfg. Works, Inc.
Rega Mfg. Co.

OIL BURNERS

Automatic Burner Corp.
Century Engineering Corp.

New pressure oil burner and new series of oil burning boilers by **Timken Silent Automatic Co.**, Detroit, Mich. . . . A rekindling control with automatic over-heat prevention for stokers and a new line of clock controlled switches for use with single or dual thermostats by **Tork Clock Co., Inc.**, Mt. Vernon, N. Y. . . . A device for use in ducts to permit the use of all right angle elbows throughout the system and a volume control device which also provides uniform distribution of air over a grille surface by **Tuttle & Bailey, Inc.**, New Britain, Conn. . . . New line of diffusional and directional flow air conditioning registers by **United States Register Co.**, Battle Creek, Mich. . . . Oil burning furnace and air conditioning unit by **Waterman-Waterbury Co.**, Minneapolis, Minn. . . . Air conditioning unit for use with boiler and radiator heating by **Weil-McLain Co.**, Chicago, Ill. . . . Small low priced, belt-driven and direct-connected centrifugal pumps and new line of deep well turbine pumps by **Worthington Pump & Machinery Corp.**, Harrison, N. J. . . .

In operation or special showing . . . Sheet metal duct work forms a frame around the booth of **American Rolling Mill Co.**, demonstrating fabrication details. . . . A moving exhibit of steel sheets greets the eye at the booth of **Bethlehem Steel Co.** . . . Lights and mirrors are utilized to show the action of a balanced

Chalmers Oil Burner Co.
Delco Appliance Corp.
Electrol, Inc.
Gilbert & Barker Mfg. Co.
Hardinge Oil Burner Co.
Heil Co.
Johnson Co., S. T.
Kelvinator Corp.
Kleen-Heet, Inc.
May Oil Burner Corp.
Motor Wheel Corp.
Oil Burner Builders, Inc.
Peoples Oil Burner Co.
Petroleum Heat & Power Co.
Radiant Products, Inc.
Silent Glow Oil Burner Corp.
Syncro-Flame Burner Corp.
Timken Silent Automatic Co.
Viking Mfg. Co.
Wayne Oil Burner Corp.
Williams Oil-O-Matic Heating Corp.
Wood Industries, Inc., Gar
York Oil Burner Co., Inc.

PUBLICATIONS

Aerologist
American Artisan
Automatic Heat & Air Conditioning
Domestic Engineering
Fuel Oil Journal
Guide, A. S. H. V. E.
Heating & Ventilating
Heating, Piping and Air Conditioning
National Sheet Metal Contractor
Oil Heat
Plumbing and Heating Trade Journal
Refrigeration & Air Conditioning Institute
Sheet Metal Worker
Snips

PUMPS FOR AIR CONDITIONING

Allis-Chalmers Mfg. Co.
Chicago Pump Co.
De La Vergne Co.
Economy Pumping Machinery Co.
Weil Pump Co.
Worthington Pump & Machinery Corp.

REFRIGERATING COMPRESSORS

Baker Ice Machine Co.
Carbondale Machine Corp.
Carrier Engineering Corp.
Frick Co., Inc.
Frigidaire Corp.
General Electric Co.
Howe Ice Machine Co.
Ingersoll-Rand
Nelson Corp., Herman
Russell Electric Co.
Vilter Mfg. Co.
Westinghouse Electric & Mfg. Co.
York Ice Machinery Corp.

REGISTERS AND GRILLES

Barber-Colman Co.
Hart & Cooley Mfg. Co.
Independent Register Co.
Tuttle & Bailey, Inc.
Uni-Flo Corp.
United States Register Co.
Waterloo Register Co.

SHEET METAL TOOLS

Dreis & Krump Mfg. Co.

SHEETS

American Brass Co.
American Rolling Mill Co.
American Sheet & Tin Plate Co.
Bethlehem Steel Co.
Chase Brass & Copper Co.
Republic Steel Corp.
Tennessee Coal, Iron & R. R. Co.
United States Steel Corp.
Youngstown Sheet & Tube Co.

STOKERS

Burke Stoker & Mfg. Co.
Eddy Stoker Corp.
Fairbanks, Morse & Co.
Holcomb & Hoke Mfg. Co.
Illinois Iron & Bolt Co.
Iron Fireman Mfg. Co.
Nelson Corp., Herman

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and unbalanced motor and the vibration effect in the booth of **Century Electric Co.**, St. Louis, Mo. . . . A refrigerating machine in operation will be attached to one of the **Fox Furnace Co.'s** air conditioning furnace units to demonstrate cooling. . . .**Julien P. Friez & Sons, Inc.**, has a working exhibit of its instruments with which the visitor, by pressing buttons, can humidify, dehumidify, heat and cool a small glass chamber. . . . **Holcomb & Hoke Mfg. Co.'s** stoker is in actual operation. . . . A graphic model depicts the operation of **Ingersoll-Rand's** water vapor refrigerating unit. . . . **S. T. Johnson Co.'s** home heating and domestic hot water supply unit is in full operation. . . . In **Jones & Laughlin Steel Corp.'s** booth is a 15 ft. operating model of a blooming mill. . . . Active working demonstrations of its humidifiers, water feeders, low water cut-outs and circulating pumps can be seen at the booth of **Maid-O-Mist, Inc.** . . . A miniature restaurant enclosed in glass, attractively lighted, heated, ventilated and completely air conditioned is the main theme of **Minneapolis-Honeywell Regulator Co.'s** exhibit with its standard automatic controls regulating the temperature, humidity, etc., which can be changed at will by the spectator. . . . Motion displays of **Wilson & Co.'s** air filters are employed. . . . **Worthington Pump & Machinery Corp.** lays special emphasis in its exhibit on actual operating units. . . . A complete working model, built on a scale of ¾-in. to the foot, of **Youngstown Sheet & Tube Co.'s** new 79-inch hot continuous sheet mill dominates this company's booth.

AIR CONDITIONING SECTION

WE present in this issue two articles which are, we believe, far reaching in their significance.

- - - The first is the article by G. A. Voorhees presenting a corrected Friction Chart and a method for sizing ducts directly from the chart. This method accounts automatically for length of duct, velocity, resistance.

- - - The second is the article by S. Konzo presenting three tables from which the resistance for every part of a forced air system can be tabulated. The article explains how the tables should be used and the basis for their tabulation.

- - - These two articles make available for the first time a direct method for calculating resistance and sizing ducts without secondary tables or charts.

A MERCOID PRODUCT

THE MERCOID FAN AND BLOWER CONTROL INVITES CLOSE INSPECTION

Note the visible dial which plainly shows the temperature in the furnace hood as well as the desired high and low setting. There are many other outstanding features. This control has the unanimous approval of the trade.

Try it on your next job and note how easy it is to install and adjust.

Write for Bulletin No. 230-C

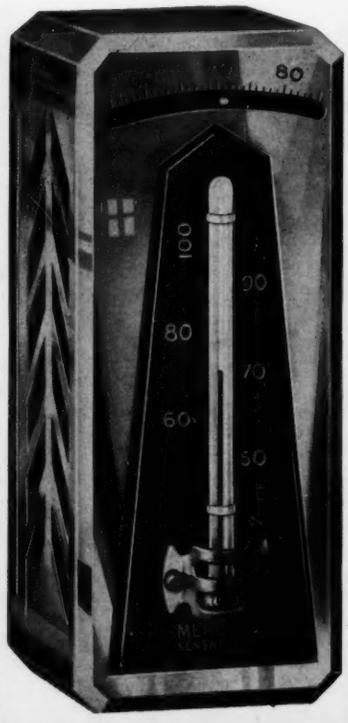
Complete line of automatic controls for heating, air-conditioning and refrigeration. Mercury switches used exclusively. They cannot be affected by dust, dirt or corrosion.

MERCOID SENSATHERM

The Thermostat of Beauty and Mechanical Perfection

This instrument requires no artificial stimulation to maintain an even room temperature. It operates on a temperature variation of ½° above or below the point set (total differential 1°). Dependable performance assured under all operating conditions. Dual Sensatherms available, which have many applications for both heating and cooling. The Dual Sensatherm combines two single circuit Sensatherms with independent adjustments, in one compact unit.

For complete information write for Bulletin No. 100



MERCOID CONTROLS ARE DISTRIBUTED AND STOCKED IN MANY CITIES BY THE GRAYBAR ELECTRIC CO., INC.

THE MERCOID CORPORATION • 4209 Belmont Avenue • CHICAGO, ILL.

1936 YEAR of OPPORTUNITY in AIR CONDITIONING

A few pertinent paragraphs by I. W. ROWELL, Mgr. FURBLO CO

With 1936, the air conditioning industry dons long trousers. It has grown out of the learning stage into the earning stage. 1936, say all predictions, will be the greatest year that this infant industry, now grown up, has yet experienced. But it will only be a profitable year for those who hear opportunity's knock and are quick to open the door.

We, of FURBLO, feel very good about what we have accomplished. Pioneers in residential air conditioning, we now offer tested and proven air conditioners—not experiments.

Consistent advertising and the distribution of over a million printed pieces a year has awakened the public's desire and created a real demand for FURBLO.

The FURBLO Institute, one of the soundest and most practical courses in the selling and engineering of air conditioning, has created a new aggressiveness and a new competence among thousands of air conditioning dealers.

The FURBLO Winter Profit Program has definitely shown dealers the way to larger earnings in the cold months when formerly they were idle. Hundreds of dealers rallying around FURBLO are now ringing up records of winter sales as healthy and substantial as their summer sales. We are mighty proud of that.

To all those who can foresee the fortunes that will be made in air conditioning in the next few years, we pledge our continued loyalty, our continued helpfulness and assistance, and our efforts to serve well.

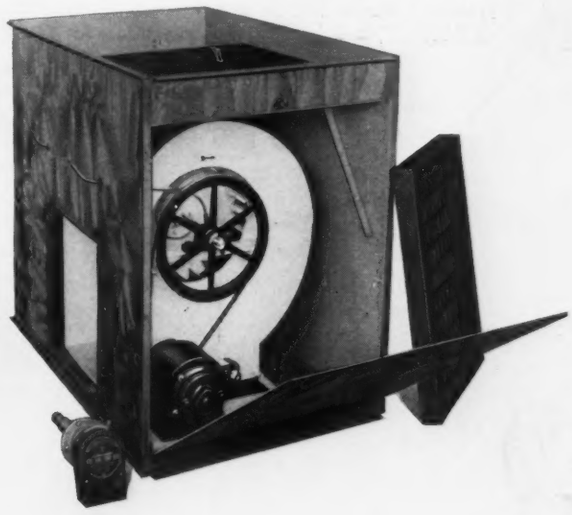
I. W. ROWELL
MGR. FURBLO CO.

SEE US IN BOOTH 536

at the International Heating, Ventilating and Air Conditioning Exposition.

The FURBLO PACKAGE UNIT

Still America's fastest selling air conditioner. Thousands of installations in every part of the country prove its efficiency and its reliability in air conditioning the warm air heated home.



FURBLO

PIONEERS IN RESIDENTIAL AIR CONDITIONING

HERMANSVILLE, MICHIGAN

To help you

SELL MORE

WARM AIR HEAT

● Dustop advertising during 1936 is aimed to tell architects and builders about the many advantages of Warm Air heat. Some of these advantages are apparent and generally recognized, others are not known. We are maintaining that filtered Warm Air is the CLEANEST, and just as efficient and economical a heating system, as any available. You can tie into this program by becoming thoroughly familiar with the application of Dustop Filters to Warm Air heating equipment. Write today! Owens-Illinois Glass Company . . . Industrial Materials Division . . . Newark, Ohio.

DUSTOP AIR FILTERS

Complete information filed in Sweet's

OWENS-ILLINOIS *Glass*

"DUSTOP" AIR FILTERS
METAL MESH BLANKETS
PIPE INSULATION
GLASS BUILDING BLOCK

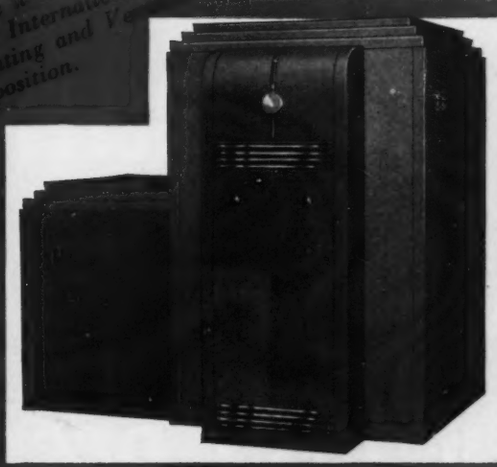
"RED TOP" INSULATING WOOL
United States Gypsum Co., Distributor

Another WATERBURY distinct improvement

All three of the major heating developments of the past 25 years FIRST appeared in Waterbury Furnaces.

1. The first all-welded seamless warm-air furnace.
2. The first furnace manufacturer to pay attention to keeping furnace dirt out of the air stream.
3. The first furnace designed for real controlled humidity.

—and now this newest development



Beauty — Efficiency — Economy

WATERBURY COMFORTROL Air-Conditioning System

Burns oil.

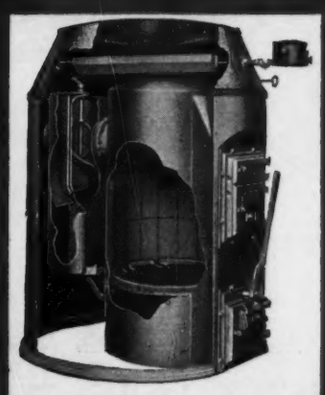
Cleans, humidifies, heats and distributes the air with new efficiency and new economies.

Write for details TODAY

in the Nationally-known Line of WATERBURY WARM AIR FURNACES

COMFORTROL AIR-CONDITIONING

Again the one best equipped to handle the heating requirements of any home will be the Waterbury Dealer. The elegant residence needs his advanced developments for controlled comfort. The humble bungalow needs his economies. Real estate promoters, architects, builders—all those whose living and reputation depend on better housing—are easier prospects for the Waterbury Dealer. He is ready to serve them, whatever the type of home, kind of fuel, size of purse.

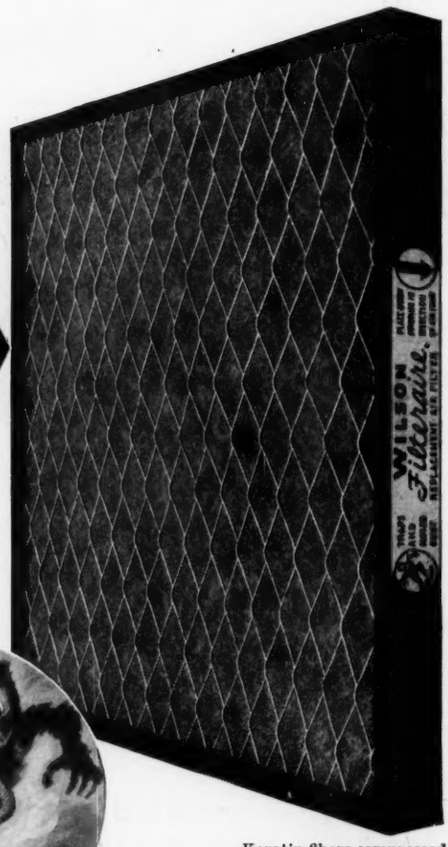


A great movement is just starting—probably the greatest building surge you will live to see. Tremendous changes are about to occur. With the suddenness of an avalanche the country—including your community—will take on modern heating plants and air-conditioning equipment. Don't fumble this big opportunity. Be equipped for everything, with the complete and proven Waterbury Line. Write us for full particulars NOW, WHILE THERE'S TIME.

WATERMAN-WATERBURY CO.

1126 Jackson St. N. E. MINNEAPOLIS, MINN.

THIS FILTER WILL GIVE YOU THE BEST RESULTS

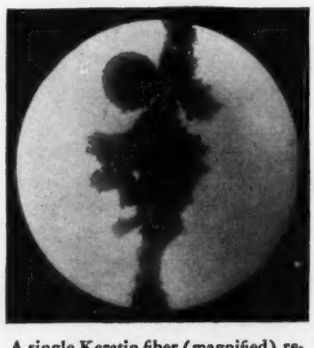


Because

- It traps and holds all of the dust.
- It gives the greatest amount of impingement surface.
- Progressive construction allows easy entrance of air into first layer, gives maximum dust holding capacity in second.
- It does not settle or pack and increase resistance to filtration.
- It is a replacement cell filter that costs little to install or replace and lasts much longer than other filters.

Keratin fibers (animal hair) are thoroughly sterilized and deodorized. Because they are subjected to successive mechanical and chemical treatments, they offer a superior media for filtering dust and dirt from the air. Investigate Wilson Keratin Filteraire replacement units before you buy. Thev will give you greater service than ordinary cell-type filters.

Keratin fibers compressed and suddenly released rebound like a sponge, giving the Filteraire higher dust holding efficiency because of greater impingement surface.



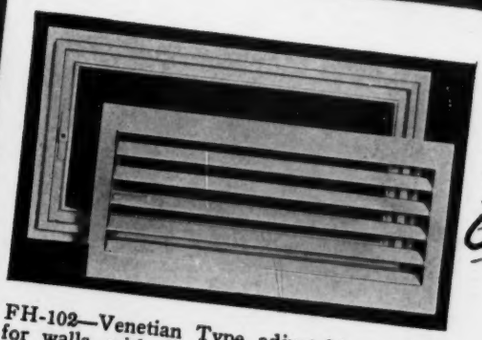
A single Keratin fiber (magnified) removed at random from a filter when in use. Note the dust clinging to adhesive on the hair.

WILSON
Filteraire
TRAPS AND  **HOLDS DUST**

WILSON & CO.

WILSON & CO., *Hair Division,* **4100 S. ASHLAND AVE., CHICAGO, ILL.**

WATERLOO



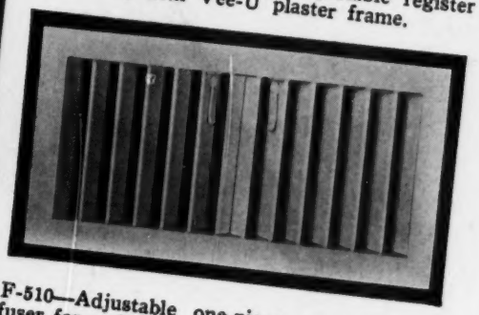
FH-102—Venetian Type adjustable register for walls, with Vee-U plaster frame.

Air Conditioning REGISTERS

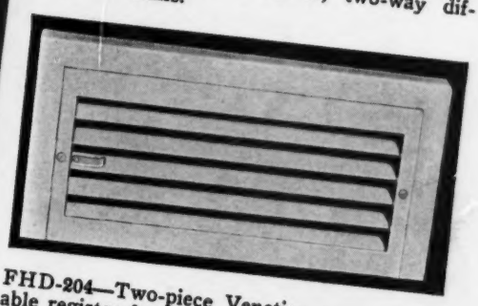
In Step With the Modern Trend

For fresh, modern beauty and smartness, specify Waterloo Air Conditioning Registers. Their slanted louvres reflect light and color, reduce the blackness of the duct, impart a distinctive "venetian blind" effect . . . a straight-line simplicity of design in complete harmony with 1936 decorating principles.

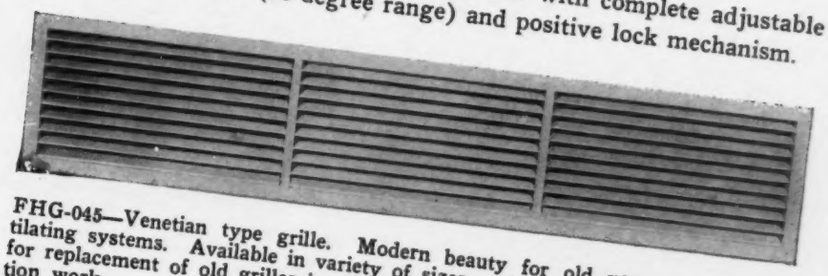
Tested capacities are provided, together with complete adjustable control of air flow (90-degree range) and positive lock mechanism.



F-510—Adjustable one-piece, two-way diffuser for walls.



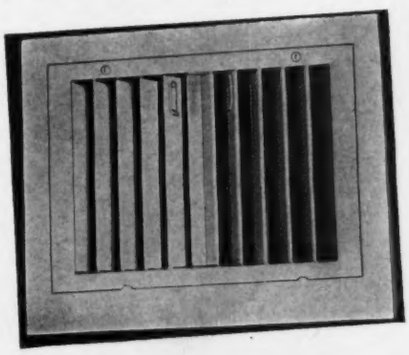
FHD-204—Two-piece Venetian type adjustable register for baseboards.

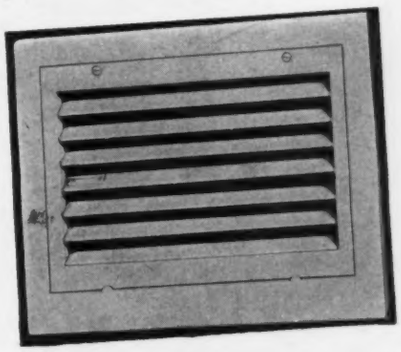


FHG-045—Venetian type grille. Modern beauty for old ventilating systems. Available in variety of sizes—suitable for replacement of old grilles in modernization work.

WATERLOO *Gravity* REGISTERS

Waterloo Gravity Registers are designed especially for gravity systems converted to the use of forced air. Adjustable horizontal vanes keep air from rising close to wall. Another style diffuses flow of air.





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Address Nearest Office or Agency

Walterloo Register Co., Waterloo, Iowa

Send new catalog of Waterloo Registers, with new designs, new charts and installation data—without obligation.

Name .....

Firm .....

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City, State .....

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WATERLOO REGISTER COMPANY

WATERLOO, IOWA

What's behind the fans YOU sell?

BRANCH ENGINEERING OFFICES AT:

ALBANY
414 Standard Bldg.
ATLANTA
724 First National Bank Bldg.
BOSTON
Melrose Station
CHARLOTTE
J. W. Fraser & Co., 124 Brevard Court
CHICAGO
20 No. Wacker Drive
CINCINNATI
622 Broadway
CLEVELAND
418 Rockefeller Bldg.
DALLAS
315 South Harwood
DENVER
Hendrie & Bolthoff Mfg. & Supply Co., 1635 Seventeenth St.
DETROIT
Coon DeVisser Co., 2051 W. Lafayette Blvd.
GREENVILLE
P. O. Box 563
KANSAS CITY
315 Dwight Bldg.
KITCHENER
Canadian Blower & Forge Co., Ltd.
KNOXVILLE
P. O. Box 2224
LOS ANGELES
708 Pershing Sq. Bldg.
MEMPHIS
134 So. Second St.
MINNEAPOLIS
619 Foshay Tower
NASHVILLE
Southern Sales Co., 117 Fifth Ave., No.
NEW ORLEANS
1415 Carondelet Bldg.
NEW YORK
39 Cortland St.
PHILADELPHIA
220 S. Sixteenth St.
PITTSBURGH
912 Fulton Bldg.
SAN FRANCISCO
Herberts-Moore Machy. Co., 550 Fifth St.
ST. LOUIS
1596 Arcade Bldg.
SALT LAKE CITY
Salt Lake City Hdwe. Co.
SEATTLE
2434 First Ave., S.
TOLEDO
1922 Linwood Ave.
WASHINGTON, D.C.
820 Woodward Bldg.
WILKES-BARRE
Power Engrg. Corp., Coal Exch. Bldg.

Your customers rely on your judgment—otherwise they would not let you install anything as important as heating or air-conditioning equipment.

Because the fan is so important to the success of the modern heating or air conditioning job, why not install nothing but Buffalo "QUIET" HVA fans, or in larger sizes, "Limit-Load" High-Efficiency fans which are in use in thousands of jobs?

Remember, Buffalo is a pioneer builder of complete lines of air conditioning equipment, fans of all types, air washers, unit heaters, unit coolers, comfort conditioners. Every Buffalo product has behind it the benefit of fifty-seven years of designing, manufacturing and testing.

BUFFALO FORGE COMPANY
497 Broadway. Buffalo, N. Y.
In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

QUIET Ventilating Fans
Air Conditioning Cabinets

7 Control Packages for the WARM AIR HEATING INDUSTRY

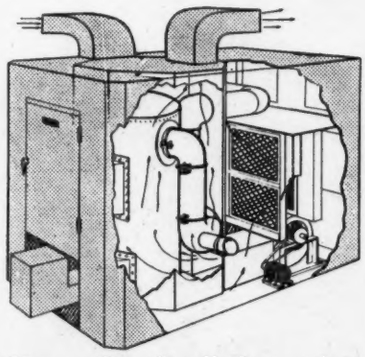
MINNEAPOLIS-HONEYWELL now offers seven control packages for the warm air field. Each package is a matched combination. Every package is complete in itself, which greatly simplifies installation. These seven warm air packages will meet practically every control need in the warm air field and they are available to you at new low prices . . . Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, Minnesota.

Branch and distributing offices in all principal cities. . . . In Canada: Minneapolis-Honeywell Regulator Co., Ltd., 117 Peter Street, Toronto. European sales and service: 233 Heerengracht, Amsterdam, Holland.

NEW LOW PRICES

MINNEAPOLIS-HONEYWELL

Control Systems



"Home Comfort" Controlaire
Unusually well-designed, quality-built air conditioning unit. *Investigate.*

We May Be Just the Right Source of Supply for You!

And here's why—

. . . you like to deal with *principals.* When you ask for a decision, you want an immediate and authoritative answer. When you have a problem, you like to talk it over directly with the person who is *responsible* for the final result.

That is the kind of service "Home Comfort" renders its dealers, and they like it, and you will like it too. Here is our proposition:

1. We supply furnaces, and complete ALL-IN-ONE air-conditioning units, that are competently engineered and quality-built. They will never let you down!
2. This organization, with a 50-year background, naturally has the experience and facilities equal to every requirement.
3. Our heating and air-conditioning layouts are practical. *They work.*
4. We know how to cooperate with you in getting business, and we enjoy doing it.

If that sounds to you like a good platform, and you are a business-getter yourself, trying to give people good service at fair prices that leave you a profit, why not send the coupon or drop us a line today for catalog and particulars? We will appreciate hearing from you.

"HOME COMFORT" FURNACE & MFG. CO.

2901 Elliott Ave., St. Louis

COUPON

Please send catalog and particulars of your proposition.

Name .....

Address .....

.....

.....

CLIP THIS TO YOUR LETTERHEAD AND MAIL AT ONCE

CELLULAR PASSAGES for BETTER PERFORMANCE

THE 90° "V" angle passages make the difference in Arco Air Filters. They take the dirt and keep it. They hold more dust and last longer—keeping uniform low resistance to the end. Here's the secret:

The strawboard of which Arco Air Filters are made holds a large quantity of adhesive. As air hits the passages and changes its direction, the dust collects in the filter. It soaks up the adhesive and becomes part of the filter. Additional surface is thus obtained—so that Arco Air Filters actually increase in efficiency with use.

Arco Air Filters are light, odorless and inexpensive. They're safe to use—won't drip oil at 180°—won't pass dry dust into the air stream. Every square inch is uniform; and filters of the same type are identical in resistance and efficiency. They're engineered on scientific principles and thoroughly tested. Use them for original equipment and replacement. It pays! Write for the facts.

■ Engineered cellular passages and 90° change in direction of air flow give Arco Air Filters their uniformity and high efficiency.

INDUSTRIAL DIVISION
AMERICAN RADIATOR COMPANY
40 West 40th Street, New York, N. Y.
Division of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

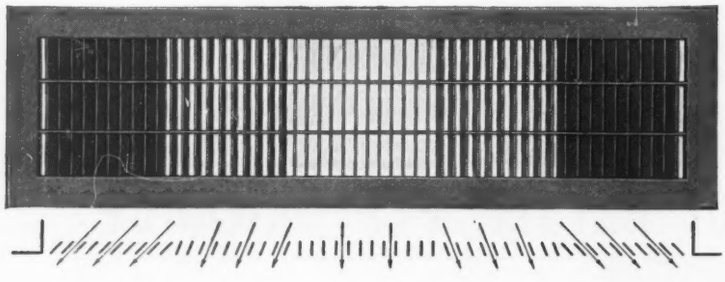
ARCO AIR FILTERS

A TYPE FOR EVERY AIR CONDITIONING AND VENTILATING JOB

INDEPENDENT

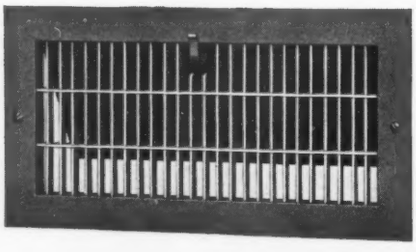
Positive Accurate Control

With this handle each grille bar can be set individually at any angle up to 45 degrees. In this manner bars were set fanwise in grille shown below.

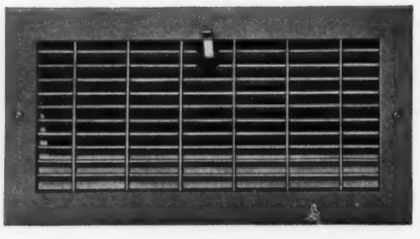


ADJUSTABLE Directed Air Flow REGISTERS AND GRILLES for Forced Air

Engineers can now direct air flows in any direction with accuracy and certainty previously unattainable. A necessity in any forced air installation if the best results are to be obtained.

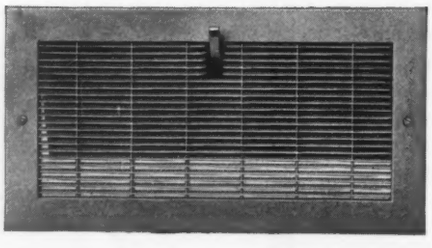


Showing all bars set for straight air flow. Bars may be adjusted to direct air flow to the right or left, either before or after installation.

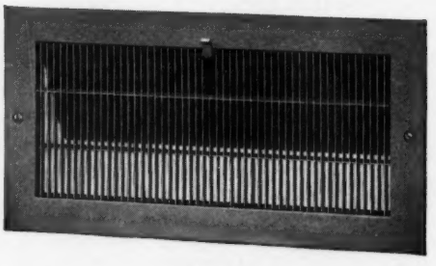


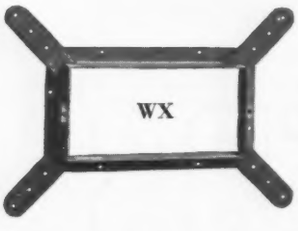
Air flow upward. These same bars, or any portion of them, can be set at any angle up to 45 degrees, an overall range of 90 degrees.

Fine mesh, directed air flow, non-adjustable. Grille bars are fixed either straight, 22½ or 45 degrees either direction.

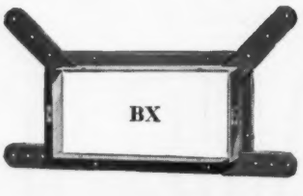


With these fine mesh registers, visibility through the bars is reduced to a minimum.



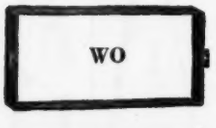


This register frame is for installation in the wall before lath and plaster.



Frame for use in baseboard at floor level to be installed before lath and plaster.

Frame for use after lathing and plastering are done.



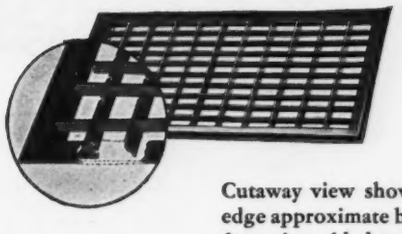
THE ORIGINAL—Always Progressing

"Fabrikated"

REG. U. S. PAT. OFF.

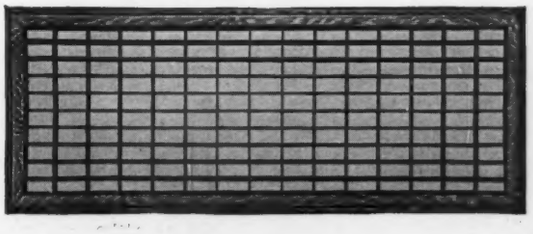
FLOOR REGISTERS AND COLD AIR FACES for Warm Air Heating

"Fabrikated" construction was originated by Independent. This construction is noted for its strength, rigidity and larger open area. It is modern in design and lends itself to the finest finishes. Any size, standard or close mesh.



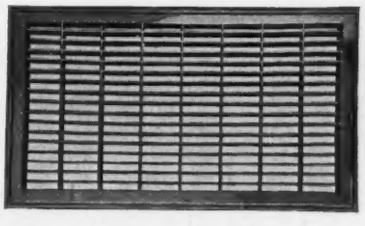
82% OPEN AREA

Cutaway view shows how the grille bars set on edge approximate bridge construction. Steel outer frame is welded to form one solid piece.

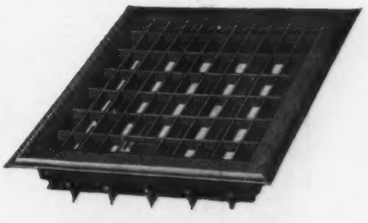


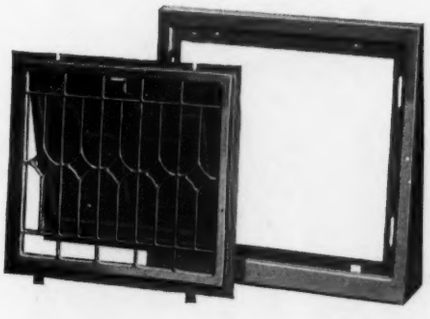
Twenty-seven distinctive finishes are available for registers and cold air faces.

Both registers and cold air faces are also made in this close mesh pattern, any size, any finish. A favorite in modern installations.



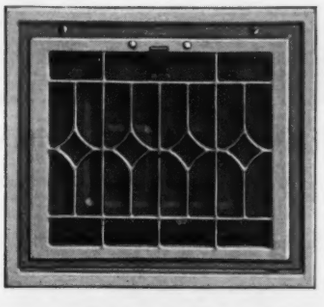
"Fabrikated" floor registers have gained steadily in popularity from the very outset. They excel in open area and appearance.





Independent baseboard registers with removable grilles are attractive and practical, with convenient valve mechanism which retains its tension indefinitely.

Independent baseboard registers are of handsome design and afford ample free area. One and two-piece styles.



Wrought steel, two-piece wall register. Register and frame are separate, the latter being removed at the time of installation.

Send for Catalogs

THE INDEPENDENT REGISTER CO.

3741 EAST 93rd STREET CLEVELAND, OHIO

Send me catalogs indicated by check marks.

☐ Forced Air Registers and Grilles.

☐ Registers and Cold Air Faces for Gravity Installations.

Name _____

Street _____

City State

. . . Always Leading

MUELLER IS READY FOR 1936

SEE THIS GREAT NEW UNIT

at our display at the International Heating and Ventilating Exposition at Chicago.

MUELLER OIL-FIRED AIR-CONDITIONING FURNACE

—the most beautiful unit in the industry. Compact and modern of line, this unit represents the first complete departure from conventional furnace design in a direct-fired forced air heating and air conditioning plant. The air passes over the heating surface not once, but three times, giving an amazing new rate of heat transfer. Here is a real business getter.

A GREAT NEW LINE OF PRODUCTS

NEW MUELLER OIL FURNACE
NEW MODERNAIRE
NEWLY STYLED CLIMATOR

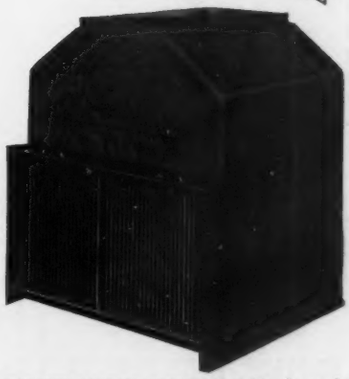
Mueller-Milwaukee proudly presents its 1936 line of heating and air conditioning equipment.

Note the beautiful new styling which fits the Mueller units to the setting of the most modern basements and rumpus rooms.

Inspect the line carefully at the International Heating and Ventilating Exposition at Chicago. If you miss the show, don't miss seeing this great line. Write at once for photographs and descriptions.

When you look over this new line, you will conclude, as have other shrewd heating men, that Mueller has scooped the industry in beauty, design and performance.

Mueller has timed its new line to the coming building boom. Write today for facts about Mueller's Sales and Advertising Program for 1936.



NEWLY STYLED CLIMATOR. Radiused corners add beauty, strength and simplicity of line to this all-in-one conditioner. A big demand is predicted for this model because it is quickly installed in new homes and is ideally suited to existing furnaces.

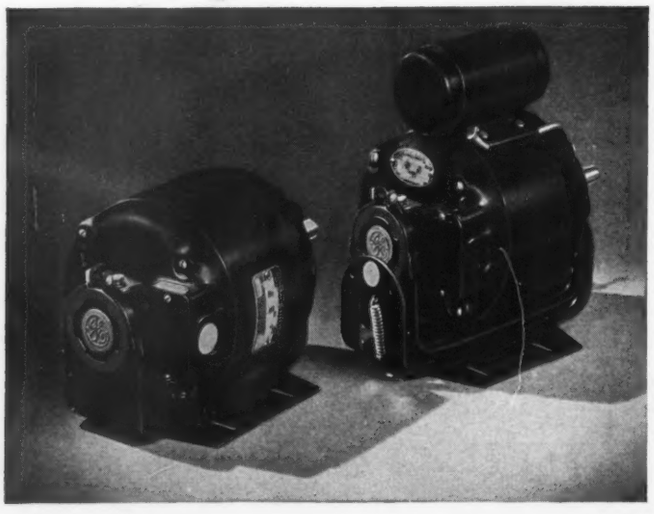
NEW MUELLER MODERNAIRE opens tremendous market among stores, shops, showrooms, small factories, where a dependable space heater is needed. The Modernaire is gas-fired, portable, and beautiful in appearance.

NEW SQUARE CASING for the famous Mueller Full Front Furnace. Illustration shows newly styled Climator IV connected to the Full Front Furnace—a winning combination for going after coal-fired business this year.

MUELLER • MILWAUKEE

L. J. MUELLER FURNACE COMPANY • MILWAUKEE, WIS.

TO MAKE SELLING EASIER



Equip WITH G-E MOTORS

WHEN you present your next installation proposition, tell the prospect that you would like to use G-E electric equipment—motors, control, cable, etc. You won't have to sell him on their desirability. He's already convinced that G-E products are *high-quality* products. ***The reputation of G-E equipment will help you sell.***

For example, General Electric offers you . . .

CARE-FREE-MOTORS . . . EASY TO INSTALL . . . SIMPLE TO MAINTAIN . . . DEPENDABLE

Type KH resistance, split-phase motors for belt-driven fans and blowers requiring up to ¼ hp; Type KC motors for the same class of service where the horsepower required is from ⅓ hp up (in the fractional-hp range). Both types have the following advantages:

LARGE OIL SUPPLY — Minimizes lubrication attention—once-a-season oiling is all that's needed.

BELT TIGHTENER (optional)—This new, radically different belt tightener depends on torque, and not on springs, for its action. It eliminates service calls for belt tightening or premature belt replacement—saves you money on that feature alone.

CUSHIONED POWER—Helps your installation set an agreeably new standard of quietness. Durable, springy rubber mounting, securely clamped in place, isolates vibration—eliminates unnecessary noise.

You can get G-E motors—small and large—in every type and size for every air-conditioning need. Our motor specialists—in a G-E office conveniently near you—will gladly help you choose. General Electric, Dept. 6D-201, Schenectady, New York.

070-106

OTHER AIDS TO SALES

G-E ALL-RUBBER PLUGS AND CORDS

General Electric all-rubber plugs are designed and built to provide staying power under trying conditions. Designed to take the most severe punishment, they are superior to ordinary plugs in many respects.

For example, their all-rubber construction prevents common breakage. G-E all-rubber plugs can be dropped or stepped on without damage to them — treatment that might ruin ordinary plugs.

These plugs have an important and exclusive feature — they are molded on the cord. This means permanent construction and lasting service. Cord and plug do not become disconnected. They have built-in strength—the result is dependability. Ask for further information.

MOTOR-STARTING SWITCH

General Electric's small motor-starting switch meets the demand for positive overload protection for fractional-horsepower motors.

Housed in a strong, steel case with an attractive aluminum face plate, it is easily installed — convenient conduit knockouts are located in both top and bottom. It is equipped with unusually large, pure-silver contacts — an assurance of long life and trouble-free service. It has snap action which prevents slow opening or closing, and also prevents burning of contacts. Write for complete details.

GENERAL ELECTRIC

LAMNECK *Simplified* GUIDE CHART

FOR FORCED AIR FITTINGS

A Practical Guide

TO SAVINGS OF
TIME and MONEY
IT'S FREE

HERE'S a new chart, handy as your hip pocket for everyone figuring forced air and air conditioning. Simplifies estimating. At a glance you tell standard sizes and prices. Simple, easy and accurate.

This chart covers 98 per cent of all fittings required. For the few specials occasionally specified equivalent areas are easily worked out by substituting standard stock sizes of corresponding dimensions. Our friends in the industry told us what they needed and we did our best to deliver. Besides its everyday usefulness, this guide shows our big stock of standard sizes, now all ready for prompt delivery at big savings plus STANDARD LAMNECK QUALITY. All reports indicate we generally save 30% of installation cost (labor and material). Get this handy guide free. Save yourself work, time and money. Ask for all the copies you want. Here's a tip! Get your architectural and engineering specification friends using this manual. It will cut your estimating time to the bone. That's money in your pocket.

Write for your copy—it's free

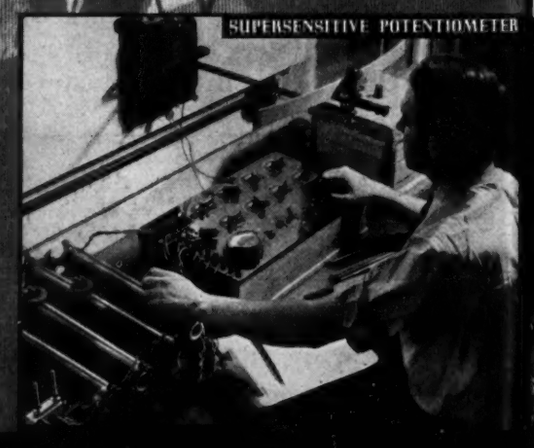
LAMNECK PRODUCTS, INC.
414-436 Dublin Ave. Columbus, Ohio

We'll be seeing you **AT THE EXPOSITION, JANUARY 27th TO 31st, SPACE 237, NEW INTERNATIONAL AMPHITHEATRE, CHICAGO**

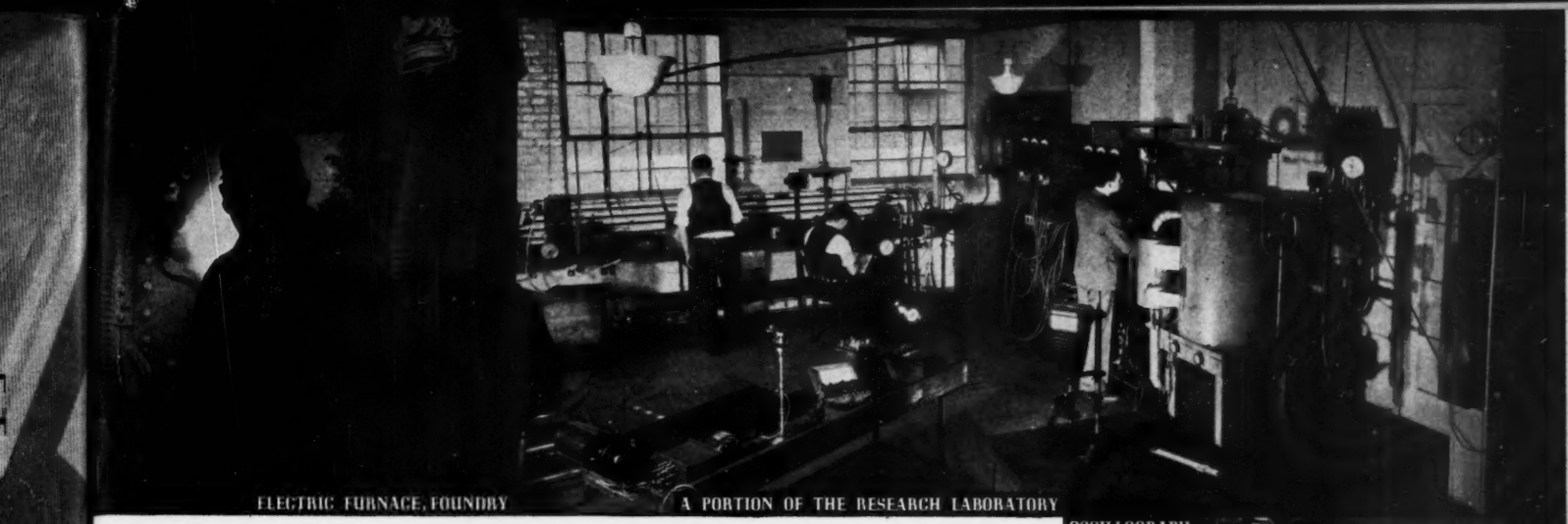
LAMNECK . . . *the Specification Standard*

REGISTERS AND SIMPLIFIED FURNACE PIPE AND FITTINGS FOR FORCED AIR AND AIR CONDITIONING SYSTEMS . . .

DEDICATED TO THE SERVICE OF AIR CONDITIONING, AUTOMATIC HEAT AND REFRIGERATION



SUPERSENSITIVE POTENTIOMETER



ELECTRIC FURNACE, FOUNDRY

A PORTION OF THE RESEARCH LABORATORY

THE fundamental objective of the great industry we all serve is, to provide the means for indoor comfort on a basis economically available to all. ¶ The skill, experience and resources of the Detroit Lubricator Company are concentrated on the engineering and economic problems involved in our part of this great program. We pledge a continuance of these efforts in order to develop progressively better "Genuine Detroit" valves and controls for an ever expanding industry.

DETROIT LUBRICATOR COMPANY

DETROIT, MICHIGAN, U. S. A. NEW YORK, N. Y.—40 West 40th St.

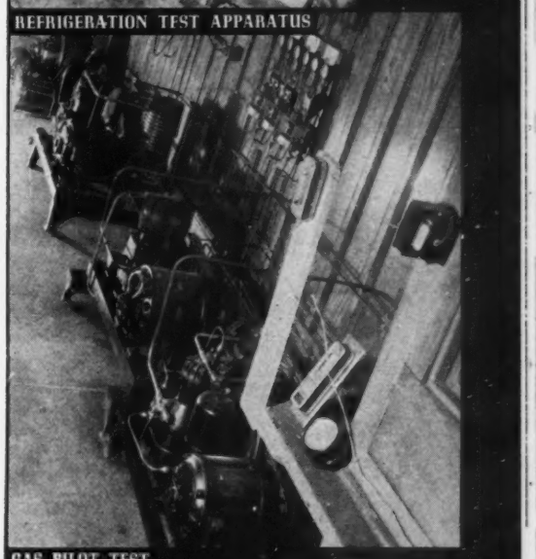
CHICAGO, ILL.—816 S. Michigan Ave. • LOS ANGELES, CALIF.—3251 Wilshire Blvd.

Canadian Representative—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg

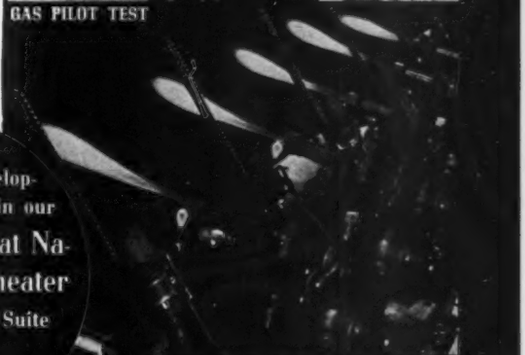
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

TRADE MARK REG. U.S. PAT. OFF.

OSCILLOGRAPH



REFRIGERATION TEST APPARATUS



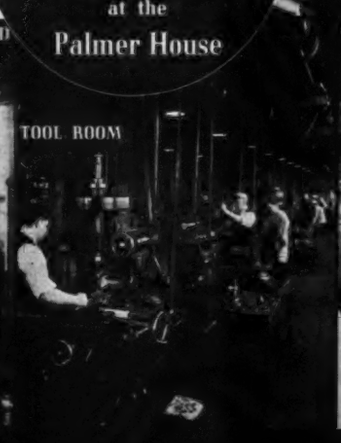
GAS PILOT TEST

Don't fail to see the new developments on exhibit in our Booth No. 504 at National Amphitheater Chicago, or in our Suite at the Palmer House

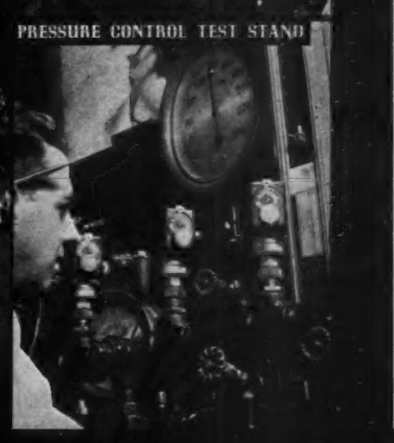
TIOMETER

PRECISION INSPECTION

SAFETY FLOAT VALVE TEST STAND



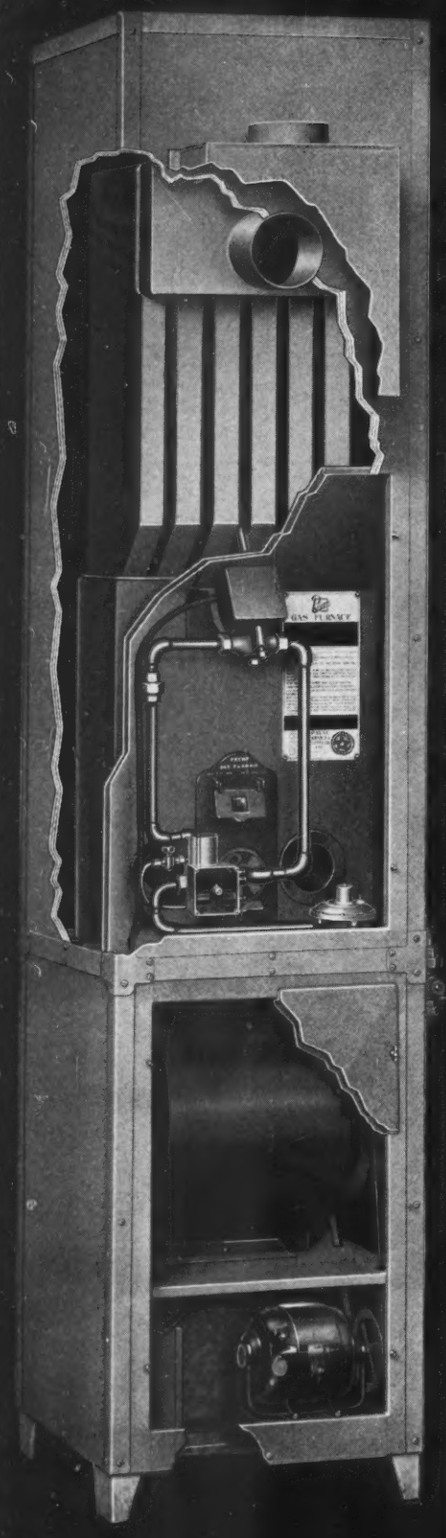
TOOL ROOM



PRESSURE CONTROL TEST STAND

The New
PAYNE "FAU" FURNACE

FORCED AIR UNIT TYPE
REQUIRES NO BASEMENT



The Finest
Comfort System Anywhere!

Payne "FAU" Furnaces are the embodiment of all that is desired for Year 'Round Comfort and Convenience . . . Controlled winter warmth and balmy summer ventilation.

COMPACT . . . EFFICIENT . . . HEALTHFUL . . . ATTRACTIVE!

■ A complete heating unit, blower and all control equipment under one casing and occupying no more space than a water heater or ice box. Installed on back porch or in a closet. No basement is required. A maximum of radiation surface, free air passage and proper insulation combine to make this unit exceptionally efficient and economical.

■ Designed for burning gas, this unit eliminates fuel storage problems and insures clean, even warmth at low cost.

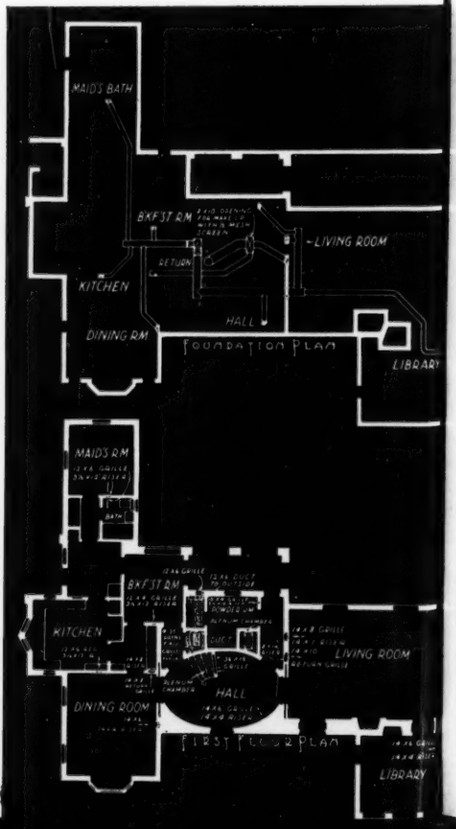
■ Neutral finish combines readily with decorative schemes and makes the unit extremely attractive.

■ The PAYNE "FAU" Furnace is applicable to varied climatic and structural conditions. Recent shipments include a unit for installation in New Haven, Conn.; another for use with Butane gas at Sarasota, Florida, and another for use in Sydney, Australia.

■ Accompanying plan shows layout for installation of one of two "FAU" Furnaces providing controlled comfort for Casa de Tempo at the Pacific International Exposition at San Diego, California. Another unit installed on second floor heats upper rooms.

■ The PAYNE "FAU" Furnace is a development resulting from twenty years of experience in designing, manufacturing and installing gas-fired heating equipment. It matches other PAYNE products in quality and the field for its use is almost without limit.

"Ask for descriptive circular"



PAYNE FURNACE & SUPPLY CO.

Beverly Hills . . California

WHICH YOU HAVE MADE POSSIBLE BY INCREASING YOUR ORDERS FOR AMERICAN FURNACE FILTERS 100% DURING 1935

In return, may we wish you increased prosperity for 1936

American Furnace Filters

AMERICAN AIR FILTER COMPANY, INC.
INCORPORATED

113 Central Avenue, Louisville, Kentucky
In Canada, Darling Brothers, Limited, Montreal, P. Q.

AMERICAN AIR FILTERS

7,000,000 HOMES

STATISTICS show an anticipated construction of some 7,000,000 houses during the next 10 years, most of which will cost less than $5,000.00.

Accordingly, the Joilet Heating Corporation have re-priced their line and introduced the New "F" Series Comfortmaker . . . the air conditioning unit that establishes a new low price for quality merchandise of this type.

THE NEW "F" COMFORTMAKER . . .

A complete qualified six stage Air Conditioning Unit meeting the Air Conditioning Standards—completely enclosed in a Baffled Cabinet of Beauty—One Piece Welded Steel Furnace—Belted Drive Blower—Furnacestat Control—Glass Filters—Automatic Humidifier and a Price that will startle the Heating Industry.

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Send your technical heating problems to us. Our trained staff of heating and ventilating engineers will gladly suggest the correct layouts and installation methods for you. A FREE service that assures correct installations and complete air conditioning efficiency.

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Blanket orders for 5 or more units will receive a floor sample on consignment . . . also a scaled discount from list . . . the more you buy at one time the larger the discount . . . also we will give a 40-cent allowance on each hundredweight of freight.

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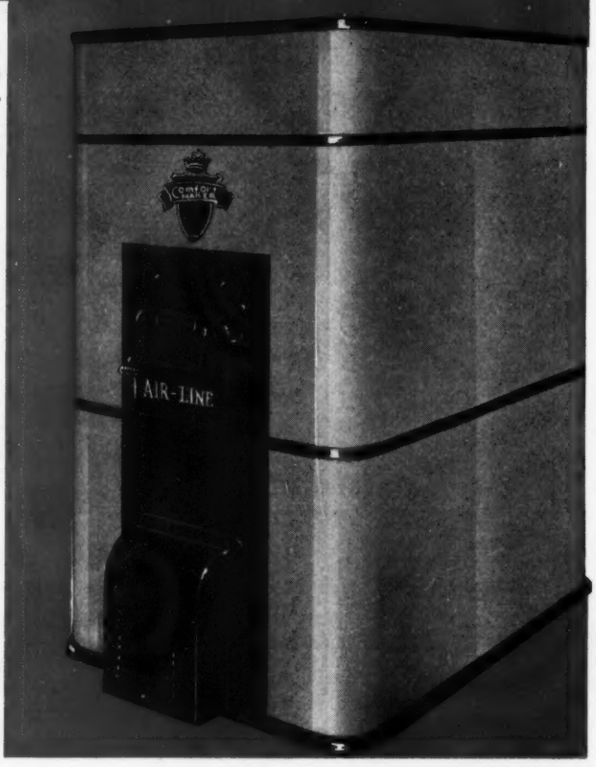

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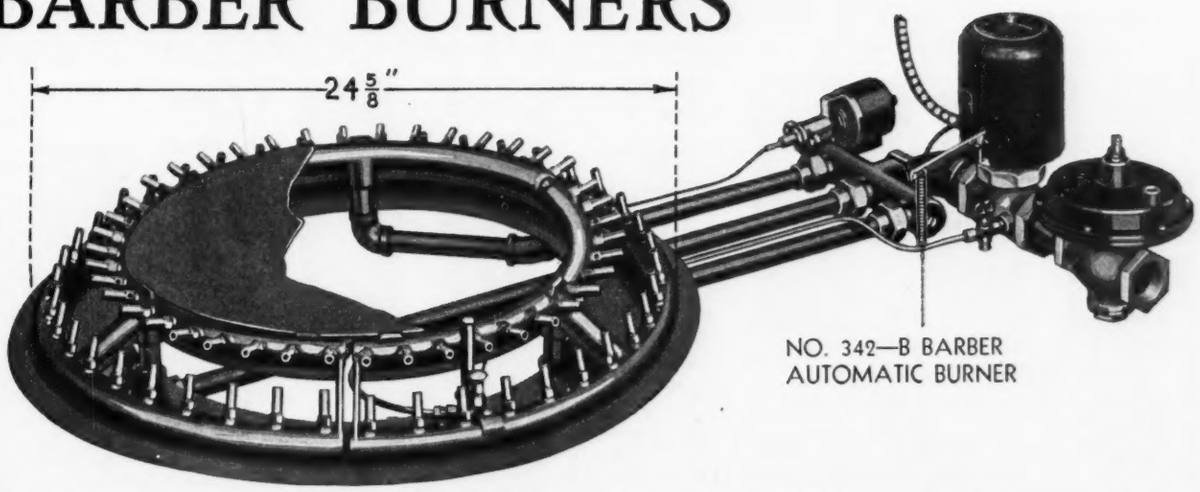

NO. 342—B BARBER AUTOMATIC BURNER

FOR 18 years the name "Barber" has set standards by which all Conversion Burners are judged. Barber sales are not "in-again-out-again" sales. They sell and STAY sold. They save "sick" jobs, eliminate removals, and reduce servicing to a minimum.

Conversion Burner sales are actively on the upswing, with the RIGHT Conversion Burner. NOW is the time for YOU to tie in with Barber. Gas Companies are providing better co-operation with the Heating Trade, in many cases are financing Time Payment Sales for Heating Contractors upon Barber installations.

Barber is not a "stock" Burner, to be taken off a shelf and STUCK into any Furnace. Every Barber Conversion Burner is SPECIFICALLY ADAPTED to the Heating System for which it is intended.

The "B" Model shown above is built in eight different sizes to accommodate round grate diameters from 12" to 34". Models are also Tailor-made to properly SUIT and FIT grate dimensions of oblong furnaces and boilers to insure a "scrubbing" flame action against the side walls of firebox. Barber's 1900° Fahrenheit Flame Temperature produces the highest possible efficiency and economy. Equipped with Klixon or Baltimore Safety Pilot for positive and accurate Safety Control. Furnished for either Manual or Thermostatic regulation. Listed in the A. G. A. Directory of Approved Appliances.

Immediate factory shipments upon individual orders make it unnecessary for you to carry an extensive stock. All Barber Dealers are supplied with Sales Literature, Specification Data Sheets, and sound, practical merchandising assistance. Act now. Write or wire for our latest Illustrated Descriptive Catalog and Revised Price List.

THE BARBER GAS BURNER COMPANY

3704 Superior Ave. Cleveland, Ohio

Why should you overlook the vast field for the sale and installation of Barber Burner Units, Gas Pressure Regulators and A. G. A. Gas Cocks especially adaptable to such Appliances as:

Air Conditioning Equipment
High Pressure Boilers (Tubular and Tubeless)
Bakery Ovens
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BARBER *Automatic* JET GAS BURNERS

• For Warm Air Furnaces, Steam and Hot Water Boilers •

and Numerous Other Heating Appliances

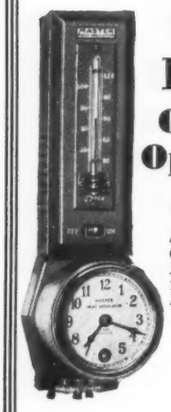
MASTER HEAT REGULATOR

It has taken nineteen years to develop heat regulators as good as these, at prices as low as these prices. No one can do better for you in less time. There is no short-cut to their built-in values, tested advancements and known accuracy. There is no price-cut can justify the absence of these things. Whether you are a contractor, jobber, manufacturer or engineering executive you get the best and save the most with MASTER PRODUCTS.

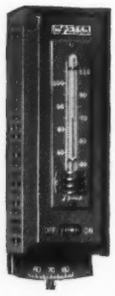
Type B-144

Gradual Operation

Four-Position



8-Day Clock Model Type B-144



Plain Model Type B-144

For precision, performance and long-time dependability this is *THE* de luxe instrument in the entire field of automatic heat control. It has four-position smoothness together with the unequalled sensitiveness of Master's patented Thermo-Wafer. Contacts are platinum-iridium. Visible "on" and "off" indicator shows draft position at all times. Special thermal starting switch requires *less than 3 watts and is non-inductive.* The four-pole induction motor operates on 9 watts. Heavy gears and special bearings are among the many features of good engineering construction that insure long life. Operates at 16 volts through a special low-reactance type of transformer. Listed as Standard by Underwriters' Laboratories.

Type B-144 Motor

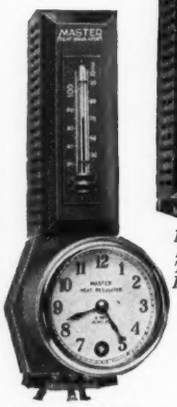
Type B-144 List Prices

8-day Clock Model (Complete)	$67.00
Plain Model (Complete)	40.00
8-day Clock Thermostat (only)	43.00
Plain Thermostat (only)	17.00
Motor (only)	24.00
Transformer, No. 2640 (only)	2.50

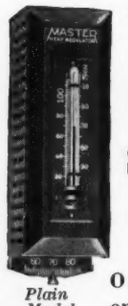
Type B-122

Super-Sensitive

Two-Position



8-Day Clock Model Type B-122



Plain Model Type B-122

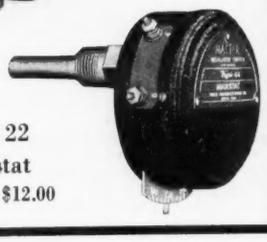
A fine precision instrument built of highest-grade materials, and with simplicity of construction that makes possible a very attractive price. Responsive to temperature variations of two degrees, or if desired, less than 1 degree. Improved thermal starting switch, as in Type B-144, requires small starting load. Platinum-iridium contacts and super-sensitive thermostatic blade are among its high-quality features. It is an accurate, trouble-free, long-lived unit that has proved popular with the trade. Type B-122 Motor differs from Type B-144 Motor only in the fact that it operates to two positions instead of four, and has two less terminal posts.

Type B-122 List Prices

8 day Clock Model (Complete)	$55.00
Plain Model (Complete)	30.00
8-day Clock Thermostat (only)	35.00
Plain Thermostat (only)	9.00
Motor (only)	20.00
Transformer, No. 2640 (only)	2.50

Limit Controls

Type 22 Furnacestat
List Price $10.00

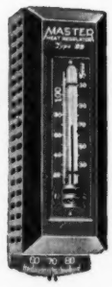


Type 22 Aquastat
List Price $12.00

Type B-22

Standard

Two-Position



One Model only — with plain thermostat. A MASTER instrument with the appearance, accuracy and reliability characteristic of the entire line. Priced for the greatest market of all—moderate salaried home owners. Has fine silver contacts, and 1 degree temperature range response. Motor is quiet with ample power to lift any damper. Will outlive the heating plant. Has small transformer, mounted as shown, which operates motor at 16 volts. Cord and plug included. Listed as Standard by Underwriters' Laboratories.

Type B-22 Motor

Type B-22 List Prices

Plain Model (Complete)	$22.50
Plain Thermostat (only)	7.00
Motor (only)	15.50

NOTE—*a complete Regulator includes 1 Thermostat, 1 Motor, 1 Transformer, 30 Feet Cable, 18 Feet Damper Chain, 4 Pulleys, Insulated Staples and Mounting Screws.*

See the complete MASTER LINE at the Chicago Show – Booth 746

WHITE MANUFACTURING CO., 2362 University Ave., Saint Paul, Minn.

Air Conditioning in 1935

1935 as shown by the survey below, was a better air conditioning year than 1934, which in turn was better than 1933. 1936 is expected to be the "best yet."

The reports shown graphically on the chart are, for the most part, taken from sources which cannot be questioned. Furnace sales were reported by the Furnace Manufacturers Institute, official tabulating agency of the manufacturers.

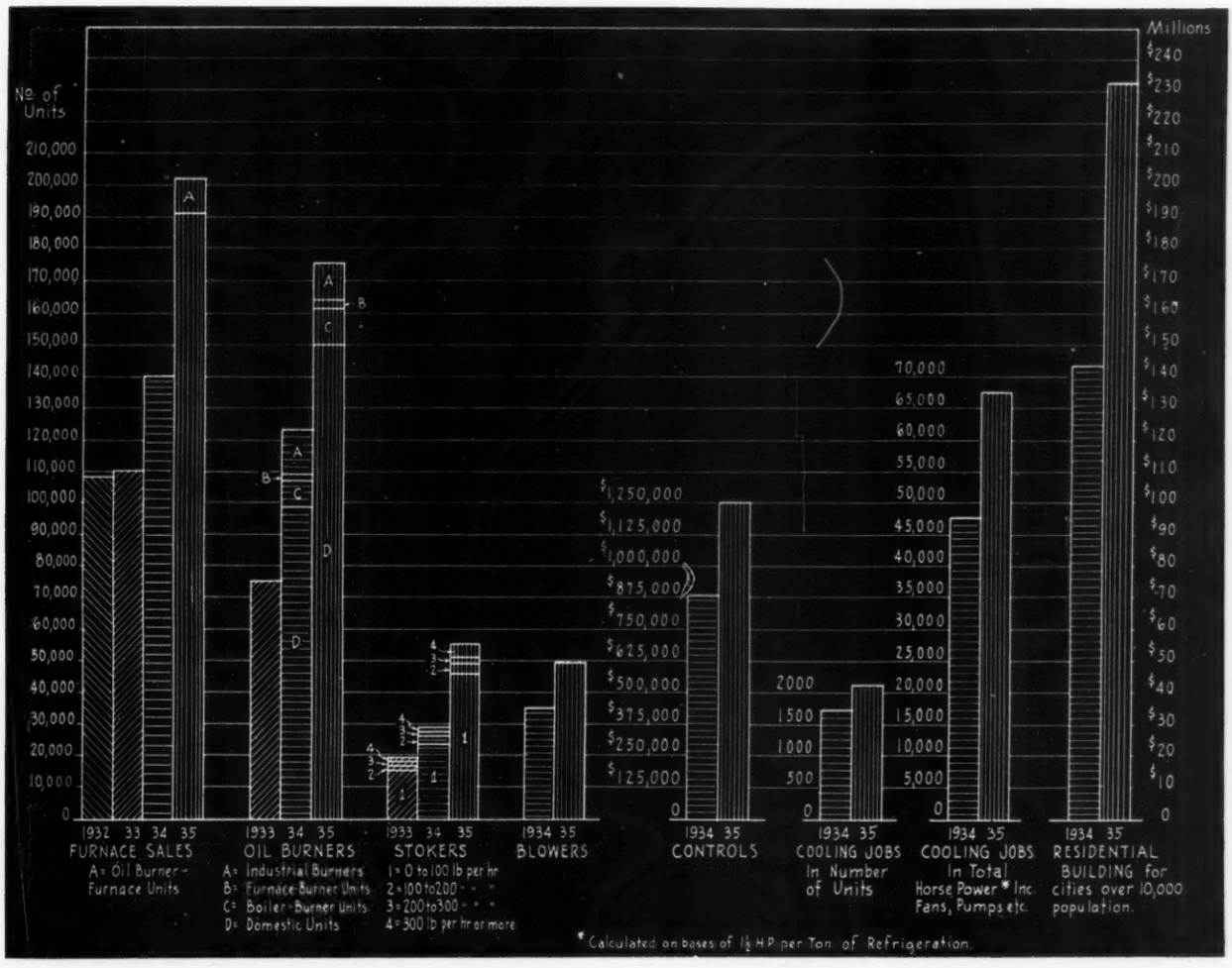
Sales of oil burners are issued by the Department of Commerce monthly. Stoker sales are reported monthly by the Department of Commerce by types and sizes as we have shown. Residential building construction for 1934 is the official figure, while 1935 is estimated on results of the first few months of the year. Burner-furnace units (B under oil burners) is from report of 181 burner manufacturers while "A" under furnace sales is furnace manufacturers estimates.

The sales of furnace blowers has no official guarantee. There is no agency (either of the industry or governmental) through which blower sales are issued. The estimated number of units must not be confused with large ventilation blowers as sales of these units are reported through the Department of Commerce. The number of furnace blower units sold in 1935 is an estimate based upon a few reports of manufacturers' sales, upon several percentage-of-increase-over-1934 statements of manufacturers and upon estimates based on sales of blowers to furnace manufacturers.

In somewhat like fashion the dollar sales of control apparatus is based upon an estimated number of forced air installations during 1935, each of which should have required a minimum of one thermostat, one draft damper motor or firing device switch, one fan control and one fire limit control. This minimum of apparatus multiplied by the number of forced air installations gives us our figure.

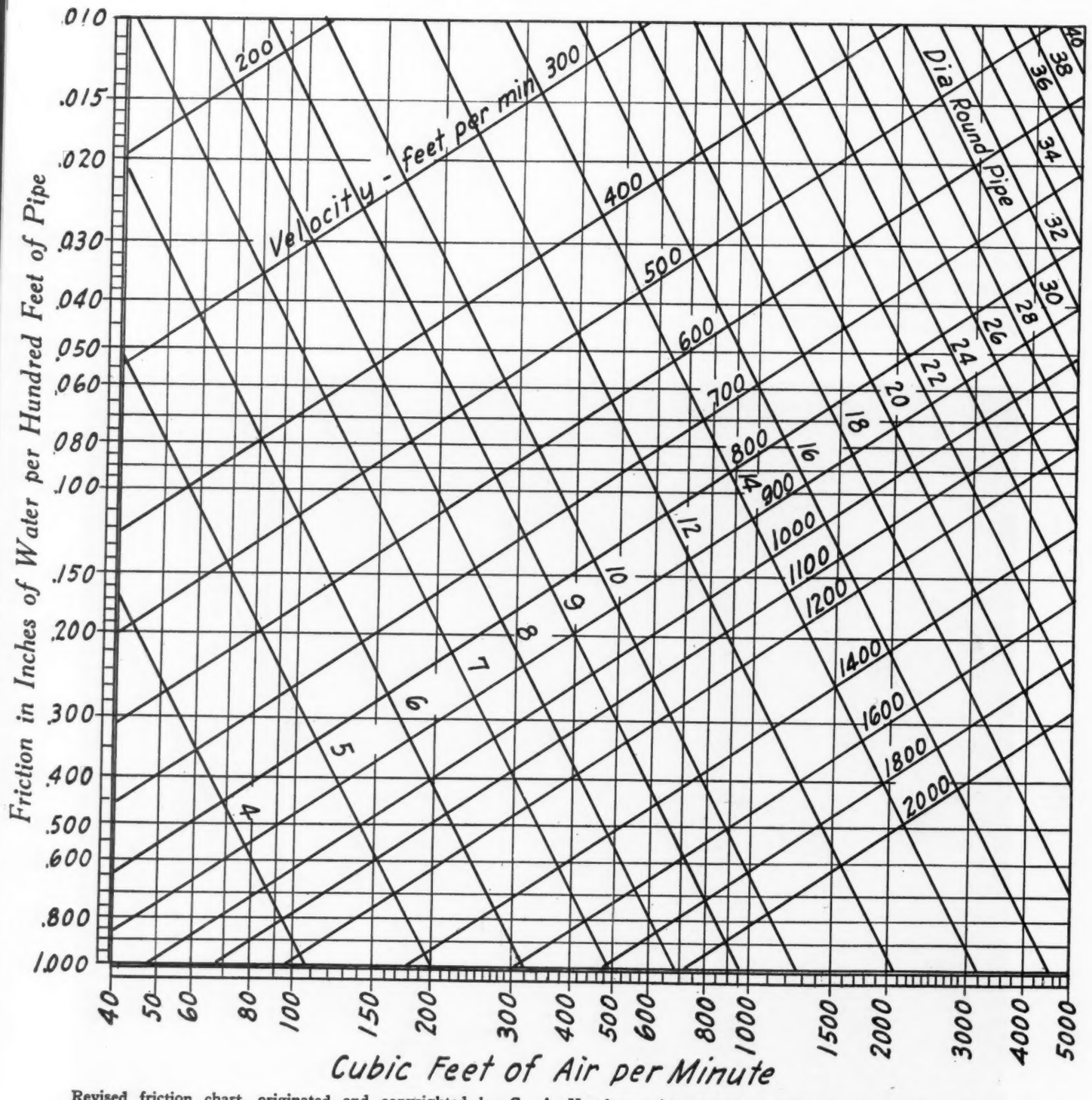
The number of cooling installations is based on data collected from utilities serving some 40 cities in various parts of the country. This figure for forty cities cannot, of course, be multiplied by any other number of cities to get the number of sales for a larger area. Cooling tonnage is based on one and one-half horse power per ton of refrigeration and is for only eleven months of 1935.

These figures (authoritative and estimated) indicate, we think, the tremendous expansion of residential, commercial, industrial air conditioning. They substantiate the oft made statement: "Air conditioning will be our next biggest business."



A Corrected Friction Chart and A Method For Sizing Ducts Directly From The Chart

No doubt you've wondered why you can't size ducts by the friction chart. You can now. We present here a revised chart and a full explanation of how to size a system.



Revised friction chart, originated and copyrighted by G. A. Voorhees with special provision for low c.f.m. and low pressure losses.

By
G. A. Voorhees
Chief Engineer
The Furblo Company

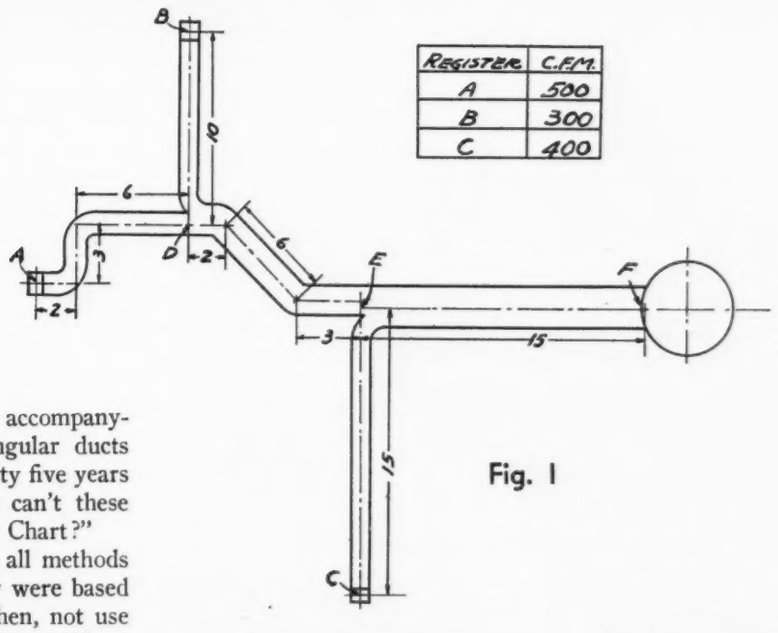


Fig. 1

EVER since forced air heating and the accompanying use of small round and rectangular ducts for conveying air came into popularity five years ago, contractors have been asking "Why can't these ducts be sized from the Standard Friction Chart?"

These contractors know, of course, that all methods using tables, charts, nomographs, originally were based upon the standard friction chart. Why, then, not use this standard chart and eliminate present methods?

The answer has been—"The standard chart is not accurate in the range of low volumes, low velocities, small pipes required in residential work. Accompanying this article is a revised chart which is accurate in the sizes required. Increased in size so that accurate placing of points can be read, this chart can be used to size ducts directly (without tables) accounting at the same time for length of pipe, resistance of fittings, temperature of air, velocity, temperature drop and stack length.

Corrected Chart Method

In Figure 1 is a simple trunk line system which well illustrates the principles involved and the accompanying table suggests a method of arranging the data systematically so it may be more readily understood.

First, find out by examining the layout, which register is furthest from the furnace. We find this to be register A and the plan shows that there are 37 running feet of duct between furnace and register. Enter this as Item I on the data sheet. (Next page.)

Item II. An elbow or angle in a duct tends to retard air flow because it changes the direction of the air current and because it creates more or less turbulence (eddy currents). There are various precise rules for determining the amount of resistance caused by elbows of different sizes and different radii. One of the most practical ways to express elbow resistance is to say that an elbow of such and such a size and throat radius, will retard the air flow or produce frictional resistance equal to that produced by so many feet of straight pipe. For the simpler residence installations where the duct system is not especially complicated, many experienced heating men assume that "one 90-degree elbow has a friction effect equal to ten feet of straight pipe." While this is not a desirable rule for designing elaborate systems, it does seem to work out very well on most residence jobs of moderate size. We'll use it here because of its simplicity and count the number of 90-degree bends in the duct leading from the furnace to register A. (See Konzo article following).

The air rises vertically through the furnace and makes its first right angle turn in passing from the bonnet into the trunk line at the point F. Between E and D there are two 45-degree turns which will be counted as one 90-degree elbow. Between D and A the plan shows two more elbows in the leader and assuming that A is a floor register, there will be a final 90-degree turn from the horizontal duct up into the register box. This gives a total of five 90-degree turns and if we figure each such elbow as producing as much friction as ten feet of straight pipe, they are "equivalent" to $5 \times 10 = 50$ running feet of pipe. This is entered as Item II of the data sheet.

Item III is the sum of Items I and II and shows that in this particular job which we are considering, the frictional resistance in the 37 actual running feet of duct between furnace and register, is (because of the elbows) equivalent to the resistance which would be offered by 87 feet of *straight* pipe.

"Static Pressure"

One of the uncertainties of fan heating has been a reasonably acurate determination of "the static pressure of the job" which should be known before the blower size and speed are specified. Without the aid of a friction pressure chart, most heating men *guess* at the static pressure against which the blower must operate—and sometimes the guess is wrong and expensive. By the use of the chart, the pressure loss of the supply and the return duct systems may be set in advance and the ducts made of such sizes as will produce the desired static pressure.

Suppose that, in this instance, we want to design the ducts in Figure 1 for a pressure loss of $\frac{1}{16}$-inch, or as we commonly and not too accurately express it, "a static pressure of $\frac{1}{16}$-inch." We enter this as Item IV, expressing it as a decimal for convenience. This resistance should be selected for the longest run or run suspected of having the greatest resistance.

Since the pressure loss in the equivalent length of 87 feet from F to A is to be 0.0625 inch, the loss in

one foot will be 1/87th of 0.0625 which is 0.000718 inch and the loss in one hundred feet would be 100 × 0.000718 which is 0.072 inch. This is recorded as Item V and establishes the basis for use of the chart as explained later.

$$\text{RULE: Item V} = 100 \times \frac{\text{Item IV}}{\text{Item III}}$$

That part of the duct system (Figure 1) running from F through E, on through to D and ending at A is called the "trunk" or "main duct." Sections DB and EC are "branches." Strictly speaking, it might be more correct to consider the trunk duct as being just that section from F to D, in which case DA would be a branch; but confusion in solving the problem by means of the friction pressure chart can be avoided by considering that *the main duct or trunk extends all the way from the furnace to the most remote register.*

Where Branches Join

Since that part of the duct system from D to A is considered as part of the trunk, we'll designate it Trunk Section AD and enter this on our data sheet as Item VI-T-1.

Item VI-T-2 is found by reference to the plan, to be $2 + 3 + 6 = 11$ running feet and it is so entered on the data sheet.

There are two elbows in the horizontal duct as shown by the plan and one additional 90-degree bend where the duct turns up into the floor register box; a total of three elbows in this section AD, and following the previously explained approximate rule of assuming each elbow to be equivalent in friction effect to ten feet of straight pipe we enter $3 \times 10 = 30$ as Item VI-T-3.

Item VI-T-4 is the sum of the two preceding items.

The pressure loss in the trunk or main duct per hundred feet of pipe (Item V) was found to be 0.0718 (entered as 0.072) and since Section AD has an equivalent length (Item VI-T-4) of 41 feet its pressure loss will be $0.41 \times 0.072 = 0.030$ which is entered as Item VI-T-5.

$$\text{RULE: Item VI-T-5} = (\text{Item V}) \times \frac{\text{Item VI-T-4}}{100}$$

Since Section AD is part of the main trunk, its pressure loss *per hundred feet* will be the same as that shown as Item V. And it is so entered as Item VI-T-6. It may seem unnecessary to enter this pressure loss per hundred feet again as Item VI-T-6, when it has already been entered as Item V, but it is done for the specific purpose of emphasizing to the beginner that the pressure loss *per hundred feet* remains the same throughout the entire length *of the trunk line.* To enable one to apply the friction pressure chart correctly, this is one point which needs to be kept in mind —hence the repetition.

In calculating the number of cubic feet of warm air which must be supplied per minute to maintain the desired room temperature, it is considered good engineering practice to assume that this air is measured at the room air temperature—usually 70 degrees. If the quantity of warm air required to heat the room is figured according to the Mechanical Warm Air Heating Code or according to the rules given in various text and reference books, the C.f.m. thus calculated is the volume measured at 70 degrees. This is entered as Item VI-T-7 which, for this particular problem as shown in the tabulation in Figure 1, is 500 C.f.m.

Correcting for Temperature

If we assume that the temperature of air in a warm air duct system will be 15 degrees higher than the register temperature and that register temperatures will range from 135 degrees to 155 degrees, the air temperatures to be expected in the supply ducts will be somewhere between 150 degrees and 170 degrees.

One cubic foot of air at 70 degrees, if heated to 150 degrees expands to 1.1512 cubic feet; if heated to 170

(*Continued on page* 108)

This data sheet is only a suggested form. You can use any form you like, but be sure it can be filled in step by step for a forgotten item is fatal. The data sheet has been filled in for the duct system shown in Fig. 1.

ITEM	FRICTION PRESSURE CHART DATA SHEET									
I	RUNNING FEET OF DUCT FROM FURNACE TO MOST REMOTE REGISTER			37						
II	ADDITIONAL ALLOWANCE FOR ELBOWS			50						
III	TOTAL EQUIVALENT LENGTH IN FEET TO MOST REMOTE REGISTER			87						
IV	PRESSURE LOSS (STATIC PRESSURE) FOR WHICH DUCT SYSTEM IS TO BE DESIGNED			0.025						
V	PRESSURE LOSS OF DUCT SYSTEM PER 100 FEET OF PIPE			0.072						
VI-T-1	TRUNK SECTION	AD	DE	EC						
VI-T-2	RUNNING FEET	11	11	15						
VI-T-3	ALLOWANCE FOR ELBOWS	30	10	10						
VI-T-4	TOTAL EQUIVALENT LENGTH	41	21	25						
VI-T-5	PRESSURE LOSS IN SECTION	0.030	0.015	0.018						
VI-T-6	PRESSURE LOSS PER 100 FT. IN SECTION	0.072	0.072	0.072						
VI-T-7	C.F.M. MEASURED AT 70°	500	800	1200						
VI-T-8	C.F.M. AT DUCT TEMP.	585	936	1404						
VI-T-9	REQUIRED ROUND PIPE DIAM.	12.5	15	17.8						
VI-T-10	AIR VELOCITY IN SECTION F.P.M.	660	750	840	D					
VI-B-1	BRANCH SECTION	DB	EC							
VI-B-2	RUNNING FEET	10	15	0						
VI-B-3	ALLOWANCE FOR ELBOWS	20	20							
VI-B-4	TOTAL EQUIVALENT LENGTH	30	35							
VI-B-5	PRESSURE LOSS IN SECTION	0.029	0.045							
VI-B-6	PRESSURE LOSS PER 100 FT. IN SECTION	0.098	0.12							
VI-B-7	C.F.M. MEASURED AT 70°	300	400							
VI-B-8	C.F.M. AT DUCT TEMP.	351	468							
VI-B-9	REQUIRED ROUND PIPE DIAM.	9.9	10.2							
VI-B-10	AIR VELOCITY IN SECTION F.P.M.	650	800							

A Table Method for Approximating Pressure Losses

By S. Konzo

Special Research Associate,
University of Illinois

Introduction

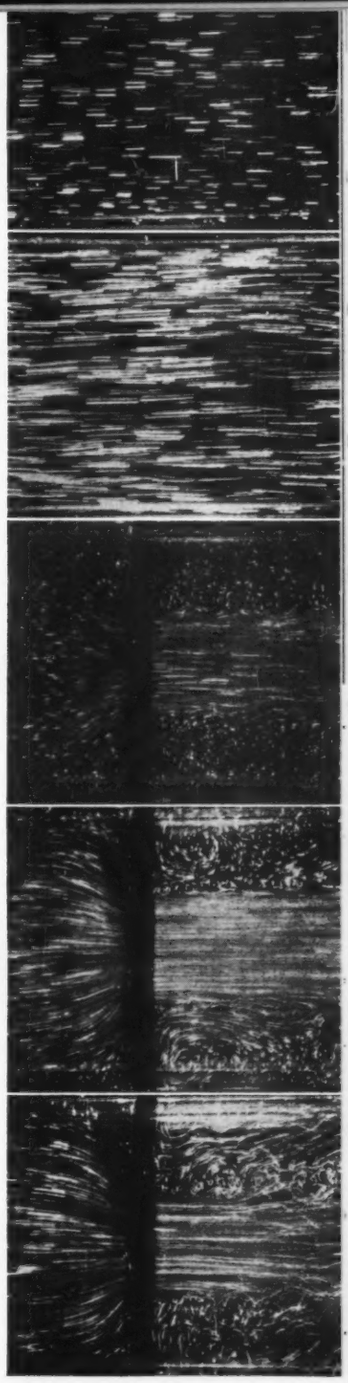
AVAILABLE data on pressure losses for various parts of a forced-air system are meager in quantity and scattered through many technical publications. The tedious work that is necessary to complete the information desired on various forms and shapes of ducts, for instance, will require several years of research. In the meantime the designer and installer of forced-air systems is confronted with the urgent problem of making a good approximation of pressure losses, in order that he may properly design duct systems. The writer has attempted to correlate such information that is available and has tabulated it in convenient form. It should be understood that a tabulation of this nature is inadequate for precise determinations, but will serve as a convenient working form for ordinary design purposes. A more detailed discussion of the individual items follows the tabulated listing.

As stated in the previous article, the pressure losses of a moving air stream are composed of one or any combination of the following factors:

a. Losses due to expansion of air stream
b. Losses due to contraction of air stream
c. Losses due to change in direction of air flow
d. Losses due to friction of air stream on sides of containing duct section
e. Losses due to turbulence of the air stream
f. Losses due to discarding the velocity head at the end of the duct.

(See Figs. 1 and 2)

It should be understood that the losses through any part of a forced-air system are not those produced by



A — Enlargement showing laminar flow.

B — Enlargement showing turbulent flow.

C — Enlargement showing flow through an orifice.

D — Enlargement showing flow through an orifice.

E — Enlargement showing flow through an orifice.

These photographs of water flow in pipes and through orifices are of interest since the characteristics of water and air flow are similar. Note the eddies and turbulence surrounding main jet, which absorb energy and account for the pressure drop which occurs when air is forced through a narrow opening.

Fig. 2—A, B, C, D, E, illustrations by courtesy E. E. Ambrosius and T. C. Reed, University of Illinois

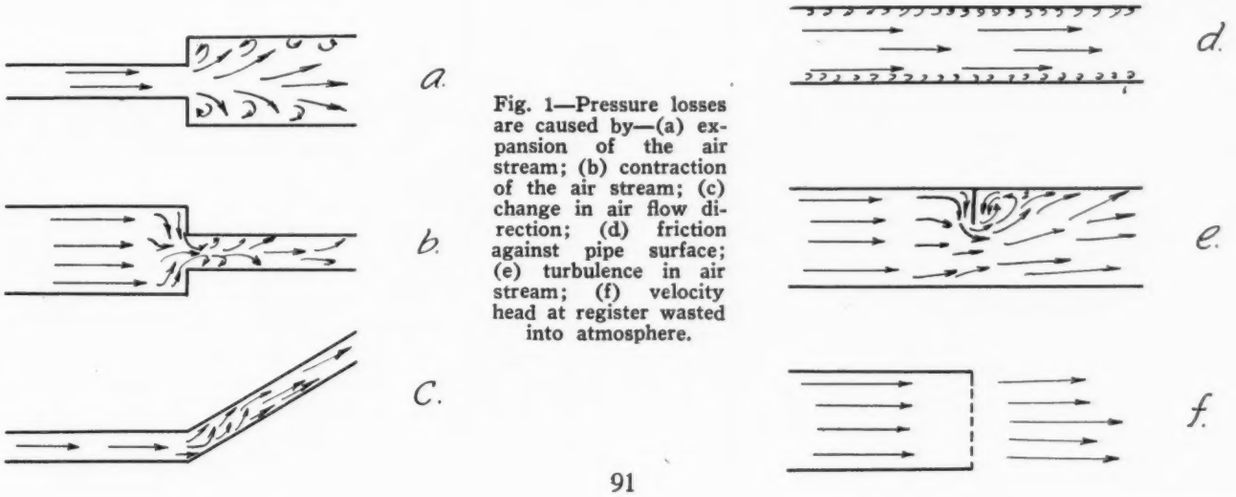


Fig. 1—Pressure losses are caused by—(a) expansion of the air stream; (b) contraction of the air stream; (c) change in air flow direction; (d) friction against pipe surface; (e) turbulence in air stream; (f) velocity head at register wasted into atmosphere.

Table I

Pressure Losses, Inches of Water

Air Velocity Ft. per min. →	200	400	600	800	1000	Notes ↓
A. - Inlet Grille	0.002	0.010	0.022	0.040	0.063	Based on loss of 1.0 velocity pressure
B. - Return Duct - (Frictional loss for 100 ft. of duct)						Based on friction chart
Equivalent Duct diameter in in.						
6	0.02	0.08	0.16	0.27	0.41	
7	0.02	0.07	0.13	0.22	0.33	
8	0.02	0.06	0.11	0.19	0.28	
9	0.02	0.05	0.09	0.16	0.24	
10	0.01	0.04	0.08	0.14	0.22	
11	0.01	0.04	0.07	0.13	0.19	
12	0.01	0.03	0.07	0.12	0.17	
13	0.01	0.03	0.06	0.10	0.15	
14	0.01	0.03	0.05	0.09	0.14	
16	0.01	0.02	0.04	0.08	0.12	
18	0.01	0.02	0.04	0.07	0.10	
E. - Warm Air Ducts	See Item B on return ducts. Values tabulated in Item B for return ducts are also applicable to warm air ducts.					
F. - Warm Air Registers						
Free Area	Plain grilles, no deflection of air					Based on
50%	0.01	0.03	0.06	0.11	0.17	2.75 v.p.
60%	0.00	0.02	0.04	0.06	0.11	1.6 v.p.
70%	0.00	0.01	0.02	0.04	0.07	0.9 v.p.
80%	0.00	0.00	0.01	0.02	0.03	0.5 v.p.
Deflectors - For deflected flow at 45° angle, use twice the value shown.						
G. - Velocity Head of air leaving register	0.00	0.010	0.022	0.040	0.063	1.0 v.p.

Table II

Pressure Losses, Inches of Water

Item C. Air Filters	c.f.m. per filter (for filters in parallel arrangement)							
Air Quantity in cu. ft. per minute	100	200	300	400	500	600	700	800
Air filters with viscous coated fibers, 2 in. thick, 16 x 25 in. filters. 2.78 sq. ft.								
New filters	0.01	0.01	0.02	0.03	0.06	0.07	0.09	0.12
For Service Condition	0.01	0.02	0.04	0.06	0.12	0.14	0.18	0.24

Item D. Furnace Casing	Total c.f.m. through casing					
Air Quantity in cu. ft. per minute	400	800	1200	1600	2000	2400
Unbaffled casing	0.01	0.02	0.02	0.03	0.03	0.04
Baffled casing	0.01	0.02	0.03	0.04	0.05	0.06

Item I. Air Washer - Eliminator Plates, one row.	Total c.f.m. through washer					
Air Quantity in cu. ft. per minute	400	800	1200	1600	2000	2400
Eliminator Plates	0.01	0.02	0.03	0.04	0.05	0.06

Table III

Pressure Loss Through Cooling Coils

Description of Coils — Finned tube type, tube diameter 5/8 in., fins 1-7/16 in. overall diameter, 8 fins per inch.

Air Velocity feet per minute →	100	200	300	400	500	600	700
1 row deep	0.01	0.02	0.03	0.05	0.08	0.11	0.15
2 rows "	0.02	0.03	0.06	0.10	0.15	0.21	0.27
3 " "	0.02	0.04	0.08	0.14	0.21	0.30	0.39
4 " "	0.03	0.05	0.10	0.18	0.27	0.38	0.51
5 " "	0.03	0.06	0.12	0.22	0.33	0.47	----
6 " "	0.04	0.07	0.14	0.26	0.39	0.55	----
7 " "	0.04	0.08	0.17	0.30	0.45	----	----

Above values are for dry air friction. If coils become wet increase above values at least 25 per cent.

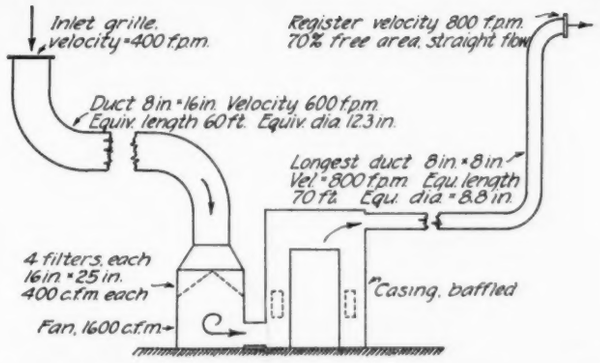


Fig. 3—This typical system is used to establish pressure losses. Begin at the farthest return face and work through to the farthest register.

any single effect alone. For instance, in the case of the pressure loss through a furnace casing, the total pressure loss will be composed of an expansion loss when the air from the fan enters the casing, a turbulence loss in the casing, a frictional loss, and an entrance loss into the warm air ducts.

For sake of convenience, the pressure losses through a forced-air heating system have been sub-divided into the following arbitrary groupings:

Suction side of systems

a. Loss through inlet grille
b. Loss through return duct
c. Loss through air filters

Pressure side of system

d. Loss through casing
e. Loss through warm-air ducts
f. Loss through warm-air register
g. Velocity head of air leaving warm-air register

Auxiliary equipment

h. Cooling coils
i. Air washers

Tables I, II, and III present in condensed form the pressure losses through the various portions of a forced-air heating system.

Table I contains a tabulation of items "a," "b," "e," "f," and "g." It should be noted that the values for pressure loss are given for different air velocities ranging from 200 to 1000 feet per minute.

Table II lists pressure losses for items "c," "d" and "i" for various air quantities.

Table III lists pressure losses for finned-tube cooling coils.

Illustrative Example

The following design conditions will serve to illustrate the manner in which the pressure values can be estimated. See also Fig. 3. It is suggested that the designer start at the return air face having the greatest pressure loss and work through the system to the warm air register having the greatest pressure loss. Let us assume that a given forced-air system has the following design characteristics:

a. Inlet grille, velocity is 400 ft. per minute. See Table I, item A, column 2 (pressure loss is 0.01).

b. Return duct, air velocity is 600 ft. per minute. The longest of the ducts has a straight run of 46 feet and has two 90-degree elbows, each of which is assumed as having a frictional resistance equal to 7 feet of straight pipe. The "equivalent length" of straight pipe is equal to: $46 + 7 + 7 = 60$ feet. The values of frictional resistance of straight pipe, which are tabulated in Table I, item "b," are for 100 feet of duct. Therefore, 60 feet of duct will have a frictional resistance equal to 0.6 of the value which is given in the table.

The return duct is rectangular in shape, 8 inches deep and 16 inches wide, whereas the values listed in item B, Table I are for circular pipe. It is necessary to find the diameter of a circular pipe which would have the same frictional resistance per foot of run as the given rectangular pipe. Reference to Table 4 (the common round–rectangular equal friction chart) shows that an 8 by 16 rectangular duct has an equivalent diameter of 12.3 inches. See Table I, item B, column 3, 12-in round pipe, (pressure loss is 0.07 per 100 feet).

c. Filters, four in number, each 16 in. by 25 in. in dimension and composed of viscous fibres. Depth of filters is 2 in. Air quantity handled by each filter equals 400 cu. ft. per minute. See Table II, item C, column 4 (pressure loss is 0.06).

Hot Side

d. Furnace casing is baffled. Air volume handled is 1600 cu. ft. per minute. See Table II, item D, column 4 (pressure loss is 0.04).

e. The longest warm-air duct in the system is composed of 58 feet of straight run and two 90-degree elbows, each of which is equivalent in resistance to 6 feet of straight duct. The total "equivalent" duct length is, therefore, equal to: $58 + 6 + 6 = 70$ feet.

It may be noted from Table 4 that an 8 in. by 8 in. square duct has an equivalent round diameter of 8.8 in. See values of frictional resistance for warm-air duct in Table I, item B, column 4 (pressure loss is 0.16 per 100 feet).

f. Warm-air register has 70 per cent free area. (That is, 70 per cent of the register frame opening is not obstructed). The register is of the type that does not deflect the air at an angle. Register air velocity is assumed as 800 feet per minute in this particular example. See values of frictional resistance in Table I, item F, column 4 (pressure loss is 0.04).

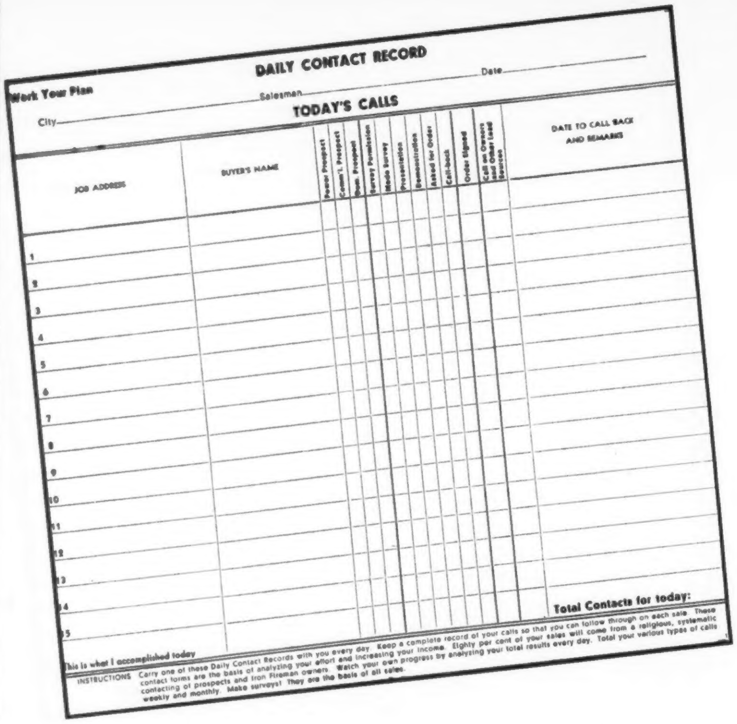
g. Velocity at register face of the air entering the room is equal to 800 feet per minute. The cor-

(*Continued on page* 116)

TABLE NO. 4
EQUIVALENT ROUND AND RECTANGULAR DUCTS FOR EQUAL FRICTION

Side of Rect. Duct	Diameter of Equivalent Round Pipe																		
	2½	3	3½	4	4½	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
8	4.7	5.2	5.7	6.1	6.5	6.9	7.6	8.2	8.8											
8½	4.9	5.4	5.9	6.3	6.7	7.1	7.8	8.5	9.1	9.6										
9	5.0	5.5	6.0	6.5	6.9	7.3	8.0	8.7	9.3	9.9										
9½	5.1	5.7	6.2	6.6	7.1	7.5	8.2	8.9	9.6	10.2	10.7									
10	5.2	5.8	6.3	6.8	7.2	7.7	8.4	9.2	9.8	10.4	11.0									
10½	5.4	5.9	6.5	7.0	7.4	7.8	8.6	9.4	10.0	10.7	11.3	11.8								
11	5.5	6.0	6.6	7.1	7.6	8.0	8.8	9.6	10.2	10.9	11.5	12.1	12.6							
11½	5.6	6.2	6.7	7.2	7.7	8.2	9.0	9.8	10.6	11.2	11.8	12.4	12.9	13.4						
12	5.7	6.3	6.9	7.4	7.9	8.3	9.2	10.0	10.7	11.4	12.0	12.6	13.2	13.7						
12½	5.8	6.4	7.0	7.5	8.0	8.5	9.4	10.2	10.9	11.6	12.2	12.9	13.5	14.0						
13	5.9	6.5	7.1	7.7	8.2	8.7	9.6	10.4	11.1	11.8	12.5	13.1	13.7	14.3						
13½	6.0	6.6	7.3	7.8	8.3	8.8	9.7	10.6	11.3	12.1	12.7	13.4	14.0	14.6	15.1					
14	6.1	6.7	7.4	7.9	8.5	8.9	9.9	10.8	11.5	12.3	12.9	13.6	14.3	14.9	15.4					
14½	6.2	6.8	7.5	8.1	8.6	9.1	10.1	11.0	11.7	12.5	13.2	13.9	14.6	15.1	15.7	16.2				
15	6.3	6.9	7.6	8.2	8.7	9.2	10.2	11.1	11.9	12.7	13.4	14.1	14.7	15.3	16.0	16.5				
15½	6.4	7.0	7.7	8.3	8.9	9.4	10.4	11.3	12.1	12.9	13.6	14.3	14.9	15.6	16.2	16.8	17.9			
16		7.1	7.8	8.4	9.0	9.5	10.5	11.4	12.3	13.1	13.8	14.5	15.2	15.8	16.5	17.1	17.6			
17		7.3	8.1	8.6	9.2	9.8	10.8	11.8	12.6	13.5	14.2	15.0	15.7	16.3	17.0	17.6	18.2	18.7		
18			8.2	8.8	9.5	10.0	11.1	12.1	13.0	13.8	14.6	15.4	16.1	16.8	17.4	18.1	18.7	19.2	19.8	
19				9.1	9.7	10.3	11.4	12.4	13.3	14.2	15.0	15.8	16.5	17.2	17.9	18.6	19.2	19.8	20.4	20.9

Table 4 is the standard round-rectangular pipe friction equivalent table.



A Survey Sales Plan Which Sold Heating Specialties in 1934 and 1935

OPERATING in a city (Toledo, Ohio) where practically all lines of business were paralyzed during 1930, 1931, 1932 and fighting numerous local business setbacks during 1933 and 1934, the Schmildlin Bros. Heating Co. has adopted the sales methods of big business merchandisers.

At the beginning of the depression the Schmidlin company found itself alarmingly extended with hundreds of time-payment contracts on its books and little or no chance to collect because of bank failures and widespread unemployment. Prices for established merchandise like gravity furnaces, cleaning, repair work skidded under the onslaught of out-of-work mechanics from the heating industry and sheet metal mechanics from automobile firms. Absolutely no new construction was undertaken and most home owners were barely able to hold their homes, let alone buy improvement.

During 1930 and 1931 forced air began to make an impression on Toledo owners. Cleaning, circulation, automatic gas heat were pushed by the utilities and big business and the Schmidlin company as well. But despite the appeal of this newer form of heating, sales were extremely hard to close and still other means of keeping going had to be developed.

In 1933 when gas heat began to slack off the company introduced stokers to old customers and new prospects.

Above are shown both sides of the salesman's daily contact record. Filled in, it accounts for a man's complete working time. Below, three pages of a four-page survey for heating. The salesman is paid $2.50 when he gets permission, fills in the survey and makes a sales presentation.

DOMESTIC HEATING PLANT SURVEY

Name of Plant	Address	Phone
1. Owner	2. Buyer	3. Manager
Address	Address	Address
4. Engineer	5. Architect	6. Janitor
Address	Address	Address

Mail to (1) (2) (3) (4) (5) (6) Source: Mag. Adv. ☐ Direct Mail ☐ N. P. Adv. ☐ Sales'n ☐ Coal Dealer ☐

GENERAL INFORMATION

Building Measurements: Width............Length............No. Floors............No. Rooms...............

Type Construction: (Frame, Brick Concrete, etc.)...............

Water under Concrete?............Pipes or Drains to interfere with installation?...............

Electric Power: D.C. ☐ A.C. ☐......Volts......Cycles......Phase......Distance Stoker to Suitable Outlet...............

BOILER PLANT DATA

Type Boiler..........Made by................Catalog No..............No. C. I. Sections...............

Size Breeching......Stack Diameter......Height......Give total Boiler H. P. Connected this Stack...............

Describe in detail condition of Setting and Repair necessary before installing Stoker...............

DOMESTIC HOT WATER

Tank Diameter........Length........Gal. Capacity............Distance Bottom Water Tank (above) (below) Boiler Water line...............

Size and Type Water Heater...............No. Boiler Sections Tapped...............

Tank—Ver. ☐ Hor. ☐ No. Bathrooms...... Is Present Hot Water Supply Adequate?...............

COMPARATIVE OPERATING COSTS

Fuel Used 19......Heating Season..........(Tons, Gals. M.C.F.) Grade..........Unit Cost..........B.t.u. per Unit...............

STOKER COAL
Trade Name...............
B.t.u. per Pound...............
Price per Ton $...............

1. Heating only........................@ $.........Per Unit = $.........
2. Domestic Hot Water........................@ $.........Per Unit = $.........
PRESENT TOTAL FUEL COST (1 + 2)..............= $ ☐
Less.......*Est. Tons Stoker Coal.......@ $.........Per Ton = $ ☐
ESTIMATED ANNUAL FUEL SAVING..............= $ ☐

* If Domestic Hot Water to be Supplied by Stoker, allowance must be made when computing fuel consumption.

Normal reduction in fuel Consumption through stoker firing may in some cases be more than offset by maintaining higher average temperatures in the home over longer periods of time or by heating more rooms than were heated previously.

NOTE: Customary Units Used in Stating Fuel Costs Are: Oil—Gal. (Gallon); Coal—Tons; Gas—M.C.F. (Thousand Cubic Feet).

STEAM OR HOT WATER RADIATION

Radiator Type	Height Inches	No. Tubes	No. Sections	Sq. Ft. per Section	Sq. Ft. per Radiator	No. Radiators	Sq. Ft. Radiation

1. TOTAL DIRECT RADIATION...............

2. ALLOWANCE FOR PIPING AND PICK-UP ....(Item 1. Direct Rad.) / 3 =

3. DOMESTIC HOT WATER LOAD...............(Gallons) × (1.5 Steam) or (2 Hot Water) =

EQUIVALENT DIRECT RADIATION = 1 + 2 + 3............... = ☐

RECOMMENDED E.D.R. LOAD FOR...............BOILER = ☐

E.D.R. CAPACITY No.............STOKER = ...(Lb. per Hour) × ....(B.t.u. per Lb.) × O.......Est. Eff. = ☐

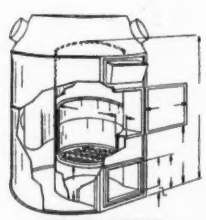
WARM AIR FURNACE

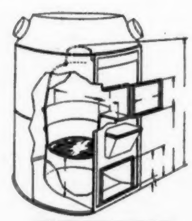
RETURN DUCTS				WARM AIR PIPES			
Size Inches	Number	Area Each Pipe	Total Area Square Inches	Diameter Inches	Number	Area Each Pipe	Total Area Square Inches
				8		50.3	
				9		63.6	
				10		78.5	
				12		113.1	
				14		154.0	
TOTAL RETURN DUCT AREA............							

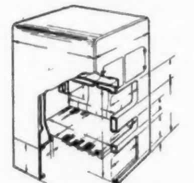
TOTAL WARM AIR PIPE AREA—SQUARE INCHES = ☐

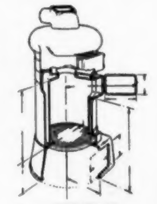
FURNACE RATED CAPACITY—SQUARE INCHES = ☐

CAPACITY No.........STOKER = ...(Pounds per Hour) × ....(B.t.u. per Pound) × O.........Est. Eff. = ☐


STEEL WARM AIR FURNACE


CAST IRON WARM AIR FURNACE


RECTANGULAR BOILER


ROUND BOILER

NOTE: If boiler is now in pit, give pit dimensions.

1. MINIMUM HEAD ROOM (Dead Plate to Boiler Shell) = ...Lb. per Hr. × ....B.t.u. per lb. × 12 / **30,000 × ....Sq. Ft. (Total Grate Area) = ...Inches*

2. HEIGHT DEAD PLATE (Shown in Service Manual)............... = ...Inches

3. (1 + 2) = TOTAL REQUIRED HEIGHT FLOOR TO SHELL............... = ...Inches

4. PRESENT HEIGHT FLOOR TO SHELL (See Sketch Above)............... = ...Inches

5. (3-4) = MINIMUM PIT DEPTH............... = ...Inches

* The distance from the dead plates to the lowest tube of a Firebox Boiler should be ⅔ Item (1) or greater.
** Where sufficient combustion volume is available behind bridge wall use 75,000 B.t.u. per cubic foot.

RECOMMENDED SETTING: FLOOR ☐ SHALLOW PIT ☐ FULL PIT ☐ FRONT ☐ SIDE ☐

New Boiler Front—Yes ☐ No ☐ Dimensions .... New Fire Doors — Yes ☐ No ☐ Dimensions...............

PROSPECT CARD

Acme 19750-B

Date Filed: Checked by: Approved by:

Make Boiler or Furnace: Catalog No.: Rating:

Grates—Width: Length: Distance—Inches Floor to Shelf: Distance—Inches Floor to Grate:

Diam. Boiler—Inches: Length of Tubes—Feet: Size Tubes—Inches: No. of Tubes:

If Steam—Pounds Pressure Carried: H. P. Load—Peak Period:

Type Plant: Steam ☐ Hot Water ☐ Vapor-Vacuum ☐ Hot Air ☐

Fuel Burned: Coal ☐ Oil ☐ Gas ☐ Coke ☐ Grade Fuel:

Total Fuel Consumed Last Year: Tons Gals. Cu. Ft. Total Cost Last Year, $

Max. Fuel Cons. Peak Hour: No. Hours: Aver. Hourly Cons.: Hours per Day:

Unit Cost Present Fuel, $ % Steam Used for Heat: % Steam Used for Power:

Electric Current: A. C. ☐ D.C. ☐ Volts. Cycle Phase:

Building Measurements—Width: Length: No. Floors: No. Apts.: No. Rooms:

Square Feet Required: Stoker Required—No.. Setting: Floor ☐ Pit ☐

Estimated Cost If Iron Fireman Installed, $ Front ☐ Side ☐ Rear ☐

Source of Prospect—National Adv. ☐ Local N. P. Adv. ☐ User ☐ Direct Mail ☐ Salesman ☐ Coal Dealer ☐

Kind of Building: (write out) Credit Rating:

(1)—Owner (2)—Buyer (3)—Manager

(4)—Engineer (5)—Architect (6)—Janitor

Prospects for Sale: Excellent ☐ Good ☐ Fair ☐ Poor ☐ Mail to: (1) (2) (3) (4) (5) (6)

Name of Plant Address Phone Srvc. No.

Follow-Up: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Zone 1 2 3 4 5 6 7 8 9 10 11 12

Above—The prospect card which is filed in the office and kept up to date day by day. At right—Insulation survey form handled like the heating survey.

Many formerly prosperous owners of gas furnaces were converted to stoker firing; hand-fired plants were made automatic with stokers. During 1934 the stoker business improved steadily, but this one line of activity was not enough. A line of oil burners was taken on, followed a little later by a line of oil-fired furnaces. These products, like the stoker, continued to gain sales momentum during 1934.

Then in 1934, the company decided that any house, irrespective of the type of fuel used or the kind of heating plant in operation would be more satisfactory if the owner got the maximum return from his heating expenditure. That meant insulation.

So at the beginning of 1935 the Schmidlin company found itself still in the furnace business, still making some gravity and forced air sales, but in stoker, oil and automatic heating with insulation running these first items a close second.

The problem then became one of so setting up the business that all of Toledo could be covered. That meant salesmen, advertising, direct mail, display. During the years since 1930 the firm had tried endless sales plans—straight salaries, commission, drawing accounts; canvassers, women doorbell ringers, unemployed men and women to sell cleaning; but always the problem boiled down to one of getting profits from the time, money and worry entailed.

INSULATION ESTIMATE

SCHMIDLIN BROS. HEATING CO.

Estimate No._____

Proposal No.____ Description_____ Prospects Name_____

LIST EACH PROPOSAL ON SEPARATE SHEET

X	DESCRIPTION	DIMENSIONS	KIND OF WORK	MAKE OPENINGS WHERE	TOTAL SQ. FT. GRAN.	TOTAL SQ. FT. BATTS	TOTAL LBS. CONN.	@	TOTAL COST

ALL COSTS TO BE FILLED IN BY OFFICE | (A) TOTAL THIS PROP.

ACTUAL COST

MATERIAL TYPE	AMT.	@	TOTAL
GRAN. BAGS			
BATTS—CART.			
COMM.—BAGS			
OTHER MAT.			
TOTAL			
SALES TAX			
LABOR INSULATION			
OTHER LABOR			
TOTAL COST			
COMMISSION			
TOTAL COST			

FINANCING

_____ MO.

AMOUNT TO BE FINANCED	AMOUNT OF NOTE	AMOUNT PER MONTH

(A) TOTAL PROP. - - - - - TOTAL

ESTIMATED COST

GRAN.	NO. CARTONS	@	TOTAL
BATTS	NO. BAGS	@	TOTAL
COMM.	NO. BAGS	@	TOTAL
OTHER MATERIAL			TOTAL
			TOTAL
			SALES TAX
PROP. - - -			TOTAL CASH PRICE

ESTIMATE FIGURE BY_____ CHECKED BY_____ DATE_____ 193__

INSULATION SURVEY

SCHMIDLIN BROS. HEATING CO.

Estimate No. ..... Surveyed by..... Date ..... 193...

Owner's Name ..... Address ..... Job at .....

From ..... Address ..... Job at .....

Office Address..... Residence Tel. No..... Office Tel. No.....

Reason for Insulating — Heat Saving ☐, Cooler in Summer ☐ Other .....

Heating Plant — Hot Air ☐, Hot Water ☐, Steam ☐, Name and No. .....

Heat Control ☐, Coal Stoker ☐, Oil Burner ☐, Make..... Air Conditioning ☐

Want Furnace Cleaned ☐, When..... 193... Remarks concerning heating.....

Fuel — Coal ☐, Coke ☐, Grade..... Tons per yr..... @ $..... Cost per yr. $.....

Oil ☐, Gallons per year..... @ .....c per gallon, Cost per year $.....

Bought from.....

Gas ☐ Oct. to May (7 mo.) .....cu. ft. @ .....c per M cu. ft. Total $..... (A)

May to Oct. (5 mo.) .....cu. ft. @ .....c per M cu. ft. Total $..... (B)

(A+B) Total for 12 mo. $..... (C) (B÷5) Avg. May to Oct. $..... (x12) $..... (D)

(C—D) App. cost of gas per yr. for htg. only $.....

Heat saving per yr.....% — $..... Per month $..... for 12 months

Building — One family ☐, Duplex ☐, Apartment ☐—No. families ..... No. floors.....

Width..... ft. ..... in. Depth..... ft. .....in. Outside Walls — Siding ☐, Shingles ☐, Stucco ☐,

Brick ☐, Stone ☐, Roof Shingles — Wood ☐, Slate ☐, Tile ☐, Asphalt ☐, Asbestos ☐,

Number of children..... Age..... Floorcrafts ☐, Draft down stairway ☐

Type electric wiring ..... Second floor hard to heat ☐, Ceilings lath marked—

First floor ☐, Second floor ☐, Walls behind rad./reg. streaked ☐.

Attic floor joists.....X..... Attic floor—None ☐, Whole ☐, Part ☐, Width.....ft. length.....ft.

Floor, Single ☐, Double ☐, Garage attached to house ☐, Rooms over ☐, Hard to heat ☐.

Insulated now ☐, Where..... Type.....

Insulate in accordance to figure.....

NOTE: Use space below to give data not covered above and other benefits from insulation.

Additional work suggested.....

NOTE: Secure blue prints of house if possible — Received..... 193... Returned..... 193...

Letter No. 1 mailed ..... 193...

Quote Proposal No. 1 $.....per mo. for.....mo. including Sales Tax.

Proposal No. 2—inc. No. 1 $.....per mo. for.....mo. including Sales Tax.

Proposal No. 3—inc. 1 & 2 $.....per mo. for.....mo. including Sales Tax.

Proposal No. 4—inc. 1, 2 & 3 $.....per mo. for.....mo. including Sales Tax.

Proposal No. 5—inc. 1, 2, 3 & 4 $.....per mo. for.....mo. including Sales Tax.

Less 1/12 of fuel savings $..... payment is only $..... per mo. for .....mo.

Presentation typed by ..... Date..... 193...

Out of all this experience a plan of sales has been evolved—perhaps not the last word in selling success—but profitable in 1934 and even more profitable in 1935.

The basis of this plan is a survey. In each of the three major activities—stokers, insulation, oil burners and oil furnaces—a survey of the prospect's house and heating equipment is the beginning, the active period and the end of each sales endeavor.

Each activity has its own survey form, detailed so that no problem can be overlooked. A sample survey sheet for insulation and stokers is shown. The procedure is as follows. The salesman picks up a prospect. He calls on that prospect or his wife and seeks to arouse interest by pointing out the savings and convenience of stoker or oil heat and insulation. The chief purpose of his sales talk is to secure the prospect's permission to make a survey. Permission gained, the survey sheet is completely filled in with no item omitted. The survey is brought in to the office so that the sheet can be checked to see that no other salesman has called on this prospect or made a survey.

For each survey accepted the salesman is paid a flat sum of $2.50, providing he also makes the presentation. Occasionally surveys are checked by phone to see that

(*Continued on page* 122)

Left—Insulation estimate on which a job is bid and cost filed. Below—Typical insulation installation and equipment.

Forced Air Heating Methods for Houses Without Basements

A trend in modern houses is toward elimination of basements. What do we do for duct and equipment space? In California basementless houses are an old story. This article describes how such houses are heated.

IN southern California several interesting developments in forced warm air heating have been under way during the last five years. That these developments may be the forerunner to similar trends in other parts of the country is at least within the range of speculation.

First of all, while southern California seldom has severe weather there are, nevertheless nights cold enough for heat and periods of the year when heat is necessary. Secondly there has been much progress made with houses of modern design—houses without basements, having flat roofs; houses which spread out over large ground areas. And last, weather makes desirable heating systems which can be turned on at a moment's notice and shut off as quickly.

Gas is a widely used fuel, small furnaces just large enough to serve a group of rooms are popular and are used in batteries grouped together or are scattered throughout the house. Because there are so many houses of one story height and without basements special systems and special apparatus have been developed and it is this apparatus and these systems which may find adoption in other sections.

With this brief description of the situation, let us look at two typical systems.

At the San Diego world's fair, in the summer of 1935, one of the display houses attracting wide interest was called Casa de Tempo and one of the chief points of interest was the heating system. The house was of Spanish architecture—two story. There was no basement. Two heating plants were used—one furnace on the first floor; the other on the second floor—both in out-of-the-way corners. Both systems were forced warm air. To get the heated air from the furnaces to the registers the first floor mains and branches ran under the first floor in trenches. Second floor regis-

◆ ◆

At the left we show from bottom to top the basement furnace and pipes, the first and second floors and pipes in the attic. The house was displayed at the San Diego Fair. See text for operating details.

ters were connected to the furnace by mains and branches running through the attic space. On the first floor branches turned up into floor registers. On the second floor branches turned down to high side wall registers.

This house was heated with gas furnaces manufactured by the Payne Furnace and Supply Company of Beverly Hills. The features of general design are well described by E. L. Payne—

"One of the principal purposes of a forced air system is to create a diffusion which will eliminate stratification—storage of unused heat above the breathing level and resultant cold floors. Air introduced into a room at a velocity of 500 feet per minute and with a register temperature of 160° Fahrenheit, will result in a proper diffusion effect within the room. This velocity can be used if registers are placed high in the wall, above a 6 foot level, or in the floor. However, if baseboard registers are used it is necessary to reduce the velocity to 250 to 300 feet per minute in order to prevent unpleasant drafts across the floor. Also, when the velocity is decreased it is necessary to increase the size of the outlet register. And, it is also true that the hotter the air the more difficult it is to diffuse incoming air wih cold air in the room.

Velocities and Distribution

"With a plenum system such as we used, we ordinarily plan for 500 feet per minute velocity in the branches and about 350 to 400 feet per minute in the plenum or main trunk. Due to the slow velocity in the main trunk we convert more velocity pressure to static pressure at the point where branches are taken off, giving more even distribution.

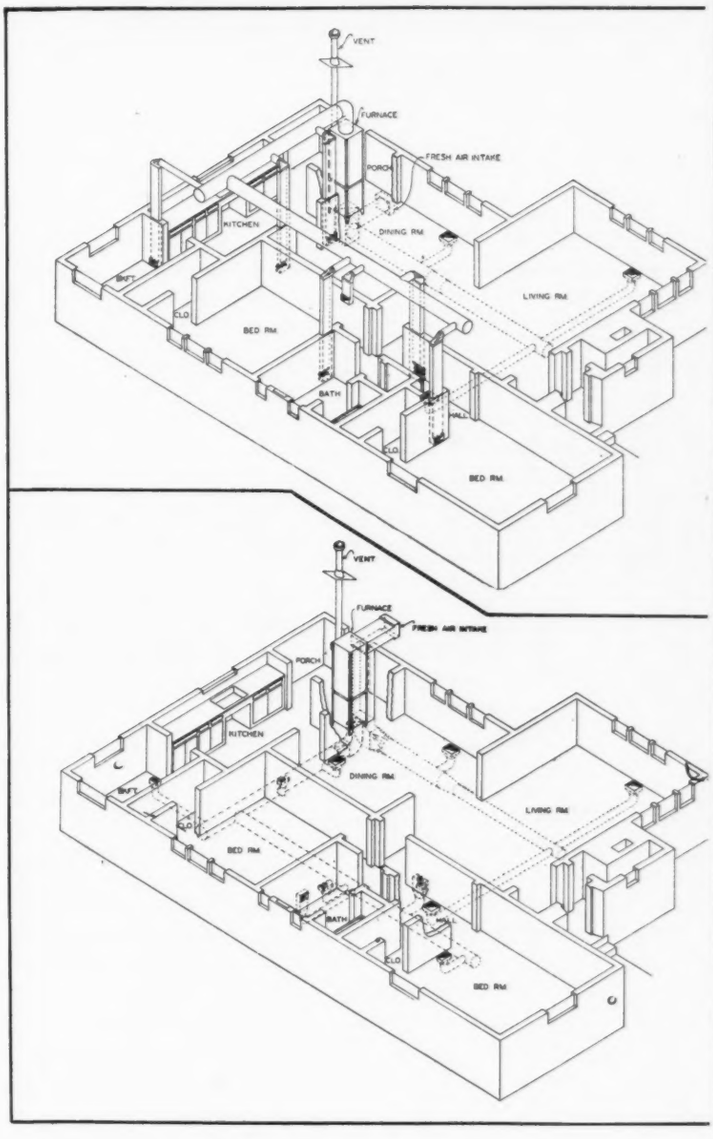
"The type of building construction usually determines whether the distribution system shall be run underneath the floor or in an attic space. Our furnaces are so constructed that they can be used for down-discharge or up-discharge, so that the system can be installed either way. The plans of the Casa de Tempo show that both methods are used—the distribution system for the main floor running beneath the floor; the second floor trunk line and branches are run in an attic space.

"We believe that round pipes are much easier to install, and are lower in cost than rectangular ducts, but we find also that round pipe has less frictional resistance. The angles in rectangular ducts have a tendency to cause turbulence and to resist the free air flow through the distribution system.

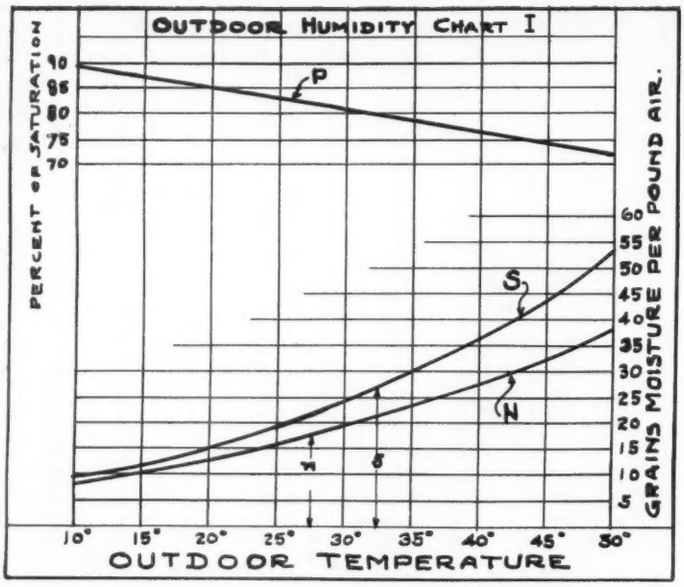
"The use of fresh air from the outside in conjunction with recirculated air return, or a complete supply of air from the outside is one on which we could dwell for quite a long time, but usually all outside air is objected to because of cost.

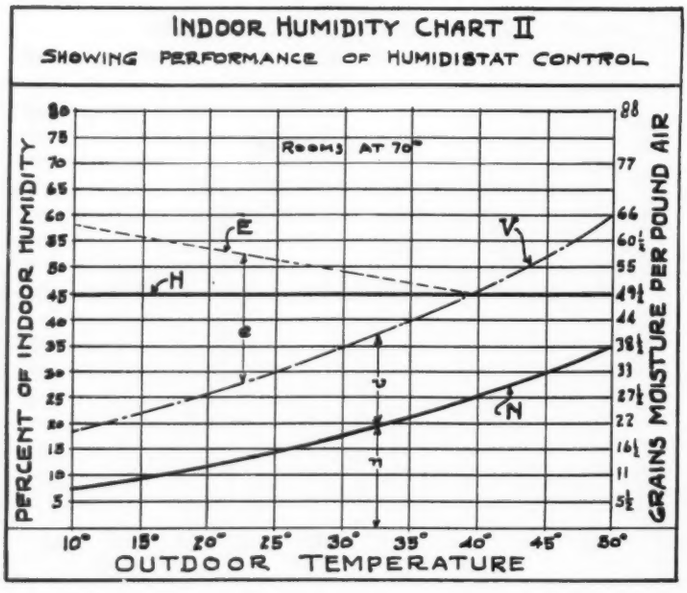
"Consider that a home owner will go to a restaurant and pay $1.50 to $3.00 a plate for a good dinner, and when he picks the cafe he will want only the best, where the food is clean and wholesome. When an illness is diagnosed as tuberculosis the patient is rushed to a sanitarium and placed on a diet of milk and put out-of-doors to live in pure, fresh air. The very best thing for sufferers with pneumonia and kindred dis-

(*Continued on page* 120)



The two drawings above show methods of carrying ducts in trenches under the first floor or through the attic. The photographs show special types of furnaces designed for placement in closets or on the first floor.





Some Basic Principles of Humidification

By O. J. Kuenhold

Engineer, Monmouth Products Co., Cleveland, O.

THE OLD idea of a heating plant was simply that it should be able to warm the rooms to 70 degrees in zero weather. That was considered the complete and only function.

The modern conception of a heating plant is not only that it should warm the rooms, but that it should also treat the air in them to make it clean, June-like and healthful. This treatment is called "winter air conditioning."

A most important function of conditioned air heating is to raise the water vapor content of the indoor air from its artificial winter dryness to a natural and healthful state of moistness. This portion of air conditioning is called "humidifying."

In spite of the importance of humidifying, heating engineers, contractors and salesmen in general seem to know less about the fundamentals of humidifying than of any other branch of air conditioning.

Articles written upon humidifying frequently contain erroneous or misleading statements. Humidifying equipment is being sold and installed that can not possibly fulfill its intended and claimed functions. Unquestionably all this has held back the general public acceptance of humidification for homes in winter.

To clear up the existing confusion and misunderstanding which prevails and to spread a knowledge of the fundamental facts of domestic winter humidifying, the accompanying charts and explanation were prepared.

Outdoor Humidity

The condition of moistness of indoor air is determined by the condition of moistness of outdoor air. For this reason it is necessary to understand certain facts about *outdoor* humidity in order to understand the essential facts of *indoor* humidity during the heating season. Chart I graphically portrays the fundamental facts about outdoor humidity clearer than is possible in any other way.

In Chart I, the vertical lines represent outdoor temperatures from 10 to 50 degrees—weather during which indoor humidifying is necessary. The horizontal lines represent the weight of water vapor held by each pound of air—a grain being one 7000th of a pound.

The maximum weight of moisture which air can hold when saturated depends upon its temperature. Curve S indicates how many grains of moisture each pound of air can hold when 100 per cent saturated. For instance, Curve S crossing the vertical 20 degree line at the horizontal 15 grain line shows that each pound of air at 20 degrees can hold 15 grains of moisture, and no more. Similarly, it can be seen that at 45 degrees, air can hold about 44 grains of moisture per pound, when 100 per cent saturated.

Moisture Capacity

Curve N shows how many grains of moisture each pound of outdoor air will actually hold, on an average, during various outdoor temperatures. For instance, at 45 degrees, the air will actually hold about 33 grains of moisture per pound. It can, however, hold 44 grains, therefore at 33 grains, the air is about 74 per cent saturated with moisture. Curve P shows the per cent of saturation of the air at various temperatures.

The per cent of saturation of air is called its "relative humidity" and indicates the relative wetness of the air. The grains of moisture in each pound of air is called its "absolute humidity." Curves N and S show "absolute humidity" while curve P shows "relative humidity" of air at various temperatures. The difference between these two measurements of humidity must be clearly understood:

Air at 20 degrees, holding 15 grains of moisture per

pound, will be 100 per cent saturated because 15 grains is all it can hold. But air at 50 degrees can hold 53 grains and if it holds only 15 grains it will be only 15/53 or 28 per cent saturated. If warmed to 70 degrees, air can hold 110 grains of moisture per pound and if it actually holds only 15 grains, it will be only 15/110 or 13.6 per cent saturated, which is very dry.

Remember that it is the per cent of saturated, called "relative humidity," that indicates the condition of moistness of the air. The absolute humidity merely shows how many grains of moisture is contained in each pound of air. Note in Chart I that as air gets colder the per cent of relative humidity (Curve P) goes upward and the grains of moisture contained in each pound of air (the absolute humidity) goes downward as shown by Curve S.

Indoor Humidity

All indoor air originates from outdoors by leakage or otherwise. After air gets indoors it will still hold exactly as many grains of moisture per pound as it held while outdoors, regardless of how much it may be warmed and expanded, provided of course, that no moisture is added to the air after it gets indoors.

Chart II tells the basic facts about indoor humidity which must be understood before you can understand winter humidifying. Since the grains of moisture per pound of air will be exactly the same indoors as outdoors at any given outdoor temperature, Curve N of Chart II is exactly the same as Curve N of Chart I, except that it is drawn to a slightly different scale.

Chart II assumes the indoor air warmed to 70 degrees, regardless of outdoor temperatures. The horizontal lines are marked at the right to show the grains of moisture per pound of indoor air and at the left to show the corresponding relative indoor humidity. For instance, in 45 degree weather the air will average 33 grains of moisture per pound. Since air can hold 110 grains per pound when warmed to 70 degrees the indoor air will be 33/110ths or 30 per cent saturated. That is, its relative humidity will be 30 per cent, as shown by Chart II.

What Happens to Outdoor Air

Note that while outdoors, at 45 degrees, the air was about 74 per cent saturated (See Chart I). When it got indoors, its absolute humidity remained the same, but because it was warmed to 70, its relative humidity decreased to 30 per cent. Similarly, it can be seen from Charts I and II that outdoor air at 20 degrees averages 85 per cent relative humidity but that, during such weather, indoor humidity will average about 12 per cent. This is extremely dry and explains why it is necessary to humidify indoor air in winter.

Curve N of Chart II is very important because it shows the per cent of *indoor* humidity existing during various *outdoor* temperatures and this forms the starting point from which the humidity is to be built up by added moisture.

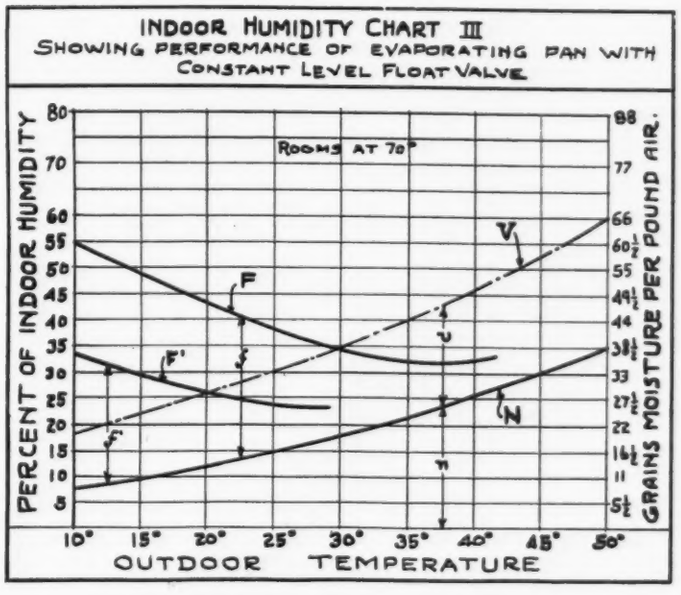
Curve V is another important curve. It shows to what per cent the indoor humidity can be raised, during various outdoor temperatures, to reach the point at which moisture begins to condense on ordinary windows, having single thickness of glass. For instance Curve V shows that during 30 degree weather, the windows will be cold enough for vapor to appear when the indoor humidity has been raised to 35 per cent, corresponding to 38½ grains of moisture per pound of indoor air.

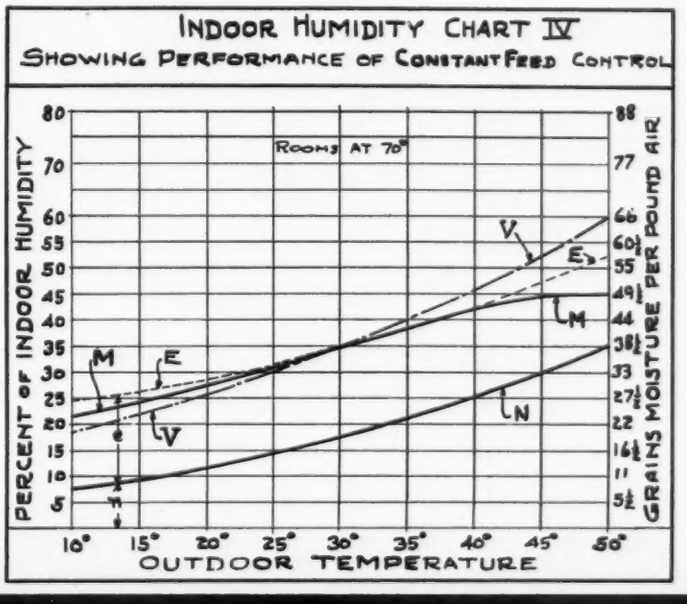
Humidity Ceiling

When indoor humidity, during any given outdoor temperature, is raised higher than the per cent of humidity indicated by Curve V for that outdoor temperature, condensation at windows will increase. If the indoor humidity is raised very much above the percent indicated by Curve V, the window condensation will become excessive and very objectionable to home owners. The practical high limit for indoor humidity is therefore indicated by Curve V and this cannot be greatly exceeded without incurring complaints.

The distance "v," from base Curve N to Curve V, will indicate accurately how many grains of moisture must be evaporated into the indoor air for each pound of air that leaks into the house, if no appreciable amount of window condensation is to be incurred.

When the preceding facts about air humidity are understood you will be equipped to judge the advantages and disadvantages of various methods of indoor





humidifying and humidity control, which will now be explained.

Humidistat Control

Humidistats, which are generally electrical instruments, are intended to hold the indoor humidity static at whatever per cent the instrument is set by the owner. Usually it is recommended that 45 per cent humidity be maintained. Let us now see exactly what occurs when this is done. Chart II tells the whole story.

The line H indicates 45 per cent indoor humidity maintained, in all weather. When outdoor temperature is 40 degrees, note that the 45 per cent of maintained indoor humidity will result in vapor just beginning to appear at the windows. This is O. K. but note that as weather gets colder, the line H, (showing maintained indoor humidity. will be an increasing distance above Curve V (which indicates the per cent of indoor humidity at which window condensation begins). This plainly shows that window condensation will increase rapidly as weather gets colder, becoming very excessive in extremely cold weather.

When moisture is thus condensed out of the indoor air, this trends to reduce indoor humidity, but as the humidistat is set to maintain 45 per cent indoor humidity, it will automatically cause evaporation of moisture into the indoor air to be increased to replace any moisture that is condensed at windows. This increases window condensation to distance, "e" from Curve V to Curve "E." The result, in extreme weather, will be a stream of water trickling down the windows and overflowing at the sills down the wall paper to the floor.

Fallacy of Constant 45 Per Cent

This plainly proves that with ordinary single glass windows, it is entirely impractical to maintain anywhere near 45 per cent indoor humidity or to evaporate anywhere near the 18 to 20 gallons of water per day per 10 thousand cubic feet of air leakage per hour that is recommended in many text books and articles upon domestic humidifying.

The only remedy, when a humidistat is employed to control indoor humidity in homes having single thickness glass windows, is to constantly reset the humidistat to maintain lower humidity as weather gets colder and higher humidity as weather gets warmer. Humidistats therefore, do *not* automatically maintain the desired per cent of humidity in homes, as is commonly imagined and is generally expected by purchasers.

Aside from causing excessive window condensation, humidity should not be maintained as high as 45 per cent in extreme weather because clothes will instantly become moist upon going outdoors causing a decided feeling of chill.

Float Controlled Evaporating Pans

Evaporating pans having a float to maintain constant water level therein are probably the commonest type of so called automatic humidifier. Chart III shows how such pans control indoor humidity as outdoor temperatures change from day to day. Curves N, showing the indoor humidity that prevails in winter when no moisture is added to the indoor air, is the same as Curves N in Charts I to IV. Curve V showing the per cent of indoor humidity at which window vapor begins to appear is the same as in Charts II and IV.

Curve F indicates the amount of water evaporated into the indoor air by a float pan, assuming the pan as having enough water surface to evaporate sufficient water to raise the indoor humidity to 35 per cent when the furnace is operated at a rate of combustion that will raise the room temperature to 70 in 30 degree weather.

In colder weather the furnace will have to be operated at a higher rate of combustion. This increases the dome and evaporating pan temperature. The amount of water evaporated will therefore increase rapidly as shown by Curve F. This results in window condensation, the excess being indicated, at various outdoor temperatures, by the vertical distance that Curve F is above Curve V. On the other hand, in weather warmer than 30 degrees, the furnace dome will not be hot enough to evaporate sufficient water to raise the indoor humidity as much as is required.

To remedy the excessive humidity maintained by a float pan of large evaporative capacity, a smaller evaporating pan is sometimes installed. The results then obtained are indicated by Curve F′, in which example the evaporation will be about right at 20 degrees outdoor temperature, too much in colder weather and not enough in milder weather. The per cent of indoor humidity maintained by float pan types will be slightly lower than that indicated by Curves F and F′, when weather is colder than the outdoor temperature line at which Curves F or F′ cross the window vapor Curve V. This is due to the dehumidifying effects of window condensation.

Thermostat Pans

Evaporating pans are also employed which have thermostatic water feed control. The thermostatic mechanism opens the water feed valve more as the furnace dome gets hotter. This is all right so far as keeping a water level according to fire acceleration but is exactly what is *not* wanted so far as room humidity is concerned. The results as to room humidity maintained are very similar to the results obtained from float controlled evaporating pans. Where a thermostatically controlled pan does not give window condensation in the colder weather it is likely the pan has entirely inadequate capacity for the milder winter weather.

Constant Water Feed

The results obtained by feeding water into an evaporating pan of adequate capacity at a constant but correct rate in all weather as shown in Chart IV make an interesting study.

Curve N shows the natural indoor humidity that will prevail in winter if no humidifying is done. If we feed water to the evaporating pan at a constant rate in all weather we shall increase the indoor hu-

(*Continued on page* 126)

Fuel Saving Resulting from the Use of Storm Windows and Doors‡

By A. P. Kratz* and S Konzo†
Urbana, Ill.

THE object of this investigation was to determine under actual service over a wide range in weather conditions, the saving in fuel that could be effected by equipping a typical residence with storm windows and doors; and to compare the actual saving so effected with the saving computed from heat loss calculations employing commonly accepted values for the coefficients of heat transmission and air filtration.

Description of Research Residence and Heating Plant

The Research Residence and heating plant have been completely described in previous publications.[1] The Research Residence, shown in Fig. 1, is a three-story

Fig. 1—Warm Air Research Residence, Urbana, Ill.

structure of standard frame construction. The wall section consists of weather boarding, building paper, sheathing, 6-in. studding, wood lath, and plaster with rough sand finish. The walls are not insulated and no weatherstripping is used at the windows and doors.

The total space heated during these tests consisted of three rooms, a sun parlor, a breakfast nook, and a hallway on the first story; three rooms, a bath room, and a hallway on the second story; and two rooms, a bath room, and a hallway on the third story. The total volume of this heated space, from which the basement was excluded, was approximately 17,540 cu. ft. The calculated heat loss was approximately 137,500 B.t.u. per hour at an indoor-outdoor temperature difference of 70 F. and approximately 159,000 B.t.u. per hour at an indoor-outdoor temperature difference of 80 F. The Research Residence is completely furnished, and during the heating season it was occupied by four people.

The heating plant consisted of a coal fired furnace used in connection with a forced-air heating system. Three cold air returns were used which were connected into a cold-air box above the inlet to a centrifugal type of fan. The furnace was placed at the East end of the basement, and the warm air registers were served from two main trunk systems. The furnace was of the cast-iron, circular-radiator type, having a 24-in. firepot and 20-in. grate, and was equipped with a casing 42 in. in diameter.

The control[2] of the heating plant was accomplished by means of a room thermostat operating to open and close the ash pit damper and to start and stop the fan. This room thermostat was used in conjunction with two bonnet thermostats which served as high and low limit controls for the temperature of the air in the furnace bonnet. The room thermostat was located on an inside wall of the dining room at a height of 5 ft. from the floor and was adjusted to maintain an air temperature of approximately 71 F. at this level in all of the rooms of the Residence.

One series of tests was run with the Residence equipped with storm windows and door, and one series was run without such equipment. For the first mentioned series, all of the windows on the three stories of the Residence, with the exception of two small quarter-round windows in the east dormitory, were provided with tightly fitting storm sash. As shown in Fig. 2, felt stripping was placed along all four contact edges and the storm sash was clamped tightly to the window casing by means of screws. One window in each of the second story rooms was fitted with hinges at the top so that outdoor air could be admitted occasionally if desirable.

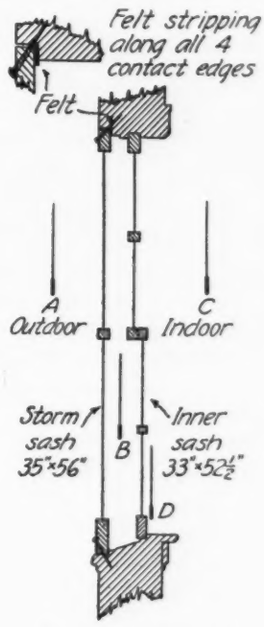


Fig. 2—Line diagram showing method of installing storm sash

*Research Professor, Engrg. Experiment Station, University of Illinois.

†Special Research Associate, Engrg. Experiment Station, University of Illinois.

[1]University of Illinois, Engrg. Experiment Station, *Bulletins Nos. 189, 246, and 266.* Also Study of Summer Cooling in the Research Residence at the University of Illinois, by A. P. Kratz and S. Konzo, A.S.H.V.E. TRANSACTIONS, Vol. 39, 1933.

‡For presentation at the 42nd Annual Meeting of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Chicago, Ill., January, 1936.

[2]Control Type IV described in the paper, Automatic Controls by Forced-Air Heating Systems, by S. Konzo and A. F. Hubbard, A.S.H.V.E. TRANSACTIONS, Vol. 40, 1934.

The front entrance was equipped with a storm door, but the rear entrance was not. The outside door at the rear opened into a vestibule which contained the basement steps, and the kitchen door opened into this vestibule. Hence an additional storm door was not considered necessary. The areas of window and door openings, of wall surfaces, and the ratios of openings to wall surfaces are given in Table 1.

Method of Conducting Tests

The two series of tests selected to determine the effect of storm windows and doors comprised part of the routine test program carried on at the Research Residence. The same test methods were employed for all such tests. The fuel burned was anthracite, having a calorific value of 13,175 B.t.u. per pound, and the controlling thermostat was adjusted to maintain a temperature of approximately 71 F. at the 5-ft. level in all rooms. This temperature was maintained during all of the 24 hours of the day.

The furnace was fired at four regular periods, namely 7:00 a.m.; 11:00 a.m.; 4.00 p.m.; and 10:00 p.m., and a record was made of the net fuel consumed during each 24-hour period. Either periodic or continuous records were made of all significant temperatures, and average daily temperatures both indoors and outdoors were obtained from these records. Each series of tests was continued over periods of sufficient length to obtain a wide range of weather conditions representative of the heating season.

Results of Tests

Infiltration. No provision was made for the continuous introduction of outdoor air. Therefore, the only infiltration that occurred was that due to leakage around the window and door frames, leakage through the frame walls, and the influx of cold air accompanying the opening of outside doors. During ordinary conditions with normal occupancy by four persons, the slight inleakage of air that occurred was sufficient to prevent any noticeable accumulation of odors. Occasionally it was found desirable to remove the cooking odors from the kitchen by opening the door to the outdoors for a few minutes. It should be noted in this connection that the outdoor air requirements to prevent accumulation of odors are comparatively small for residence service, and it is questionable whether in the ordinary residence installation, special provision for continuous introduction of outdoor air would be necessary. Any such special ventilation would, of course, partly offset the heat saving that could be accomplished by the application of tightly fitting storm sash.

Table I—Data on Window and Wall Surfaces

1.	Number of window openings	50
2.	Number of windows equipped with storm sash	48
3.	Number of door openings to outdoors	2
4.	Number of storm doors	1
5.	Area of exposed window openings, square feet	525
6.	Area of windows equipped with storm sash, square feet	522
7.	Area of exposed door, square feet	24.5
8.	Area of double door, square feet	24.5
9.	Gross area of exposed structure, square feet	3004.5
10.	Net area of exposed wall (windows and doors excluded), square feet	2455
11.	Ratio of storm windows and doors to total exposed openings, per cent	99.4
12.	Ratio of total exposed openings to gross wall, per cent	18.3
13.	Ratio of total exposed openings to net wall, per cent	22.4

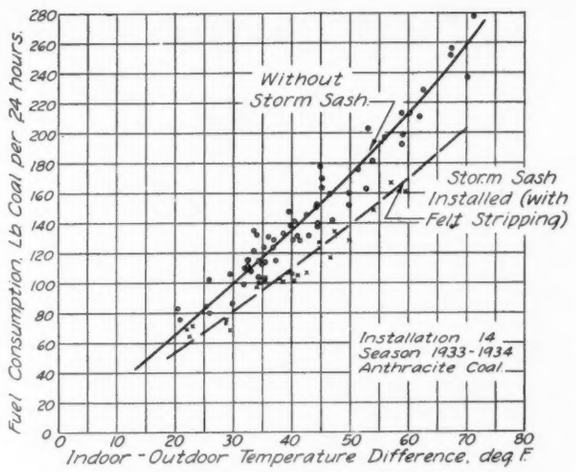


Fig. 3—Fuel consumption with and without storm sash

Comparison of Fuel Consumption. The data on the amount of fuel required to operate the Research Residence with and without storm windows and doors are shown in Fig. 3, in which the daily fuel consumption, in pounds of coal, is plotted against the difference in temperature between the indoors and outdoors. The deviations of the points from the mean curve are primarily caused by differences in daily fuel consumption brought about by variable wind and sun effects, which cannot be represented on a curve in which the abscissa is temperature difference alone. However, the deviations resulting from wind and sun effects tend to compensate when a number of tests are conducted with the same indoor-outdoor temperature difference, and the mean curve becomes representative of the actual fuel consumption when considered from the standpoint of the season as a whole.

The curves in Fig. 3 show that the average daily amount of fuel required to heat the Residence when the outdoor temperature was 40 F, which corresponds closely to the mean seasonal temperature in Urbana, Ill., was 100 lb. when storm doors and windows were not used and 81 lb. when storm doors and windows were used. This represents a saving in fuel consumption of 19 per cent attributable to storm doors and windows, The saving in milder weather was somewhat less, but in severer weather the saving increased to a value of 21 per cent shown for zero weather, or at an indoor-outdoor temperature difference of 70 F. The results therefore indicate that a saving of approximately 20 per cent in the seasonal fuel consumption could be reasonably attributed to the installation of storm doors and windows on the Research Residence.

Calculated Reduction in Heat Losses. The calculated reduction in heat losses was obtained by computing the heat losses from the structure both with and without storm windows and doors. The difference between the two calculated values would be accounted for in the items involving infiltration and heat transmission through windows and doors. These items were therefore calculated for a zero day, or for an indoor-outdoor temperature difference of 70 F, and added to the basic heat loss of 73,770 Btu. per hour, which took place through walls, ceilings, floors and all parts

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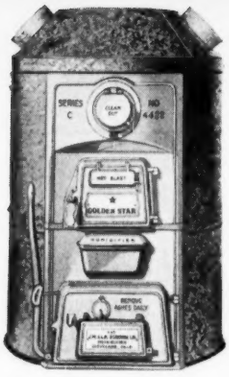
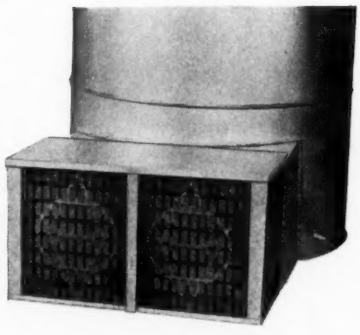
Our business is built around dependability . . . we have the absolute confidence of our dealers . . . for they know that our merchandise is of the highest quality and that it may be secured on short notice from our three conveniently located warehouses.



Golden Star Furnace

Emerson Blower



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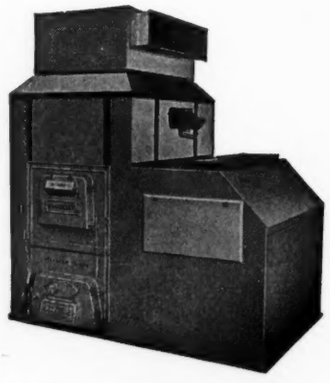


Moncrief Winter Air Conditioner

HEADQUARTERS FOR WINTER AIR CONDITIONING EQUIPMENT

THE J. M. & L. A.
OSBORN CO
BUFFALO—CLEVELAND—DETROIT

Table 2—Heat Loss Data, Based on 70 F Temperature Difference

No.	Item	Without Storm Sash	With Storm Sash
1.	Heat loss through walls, floors, and ceilings, Btu per hour	73,770.0	73,770.0
2.	Lineal feet of crack around windows (one-half of total)	356.0	356.0
3.	Lineal feet of crack around door	21.0	21.0
4.	Total area of windows, square feet	525.0	525.0
5.	Area of windows with storm sash, square feet	....	522.0
6.	Area of windows without storm sash, square feet	525.0	3.0
7.	Area of door, square feet	24.5	24.5
8.	Infiltration coefficient for windows, Btu per lineal foot of crack per degree Fahrenheit per hour	0.74	0.34
9.	Infiltration coefficient for door, Btu per lineal foot of crack per degree Fahrenheit per hour	2.00	1.00
10.	Coefficient of heat transmission for windows, Btu per square foot per degree Fahrenheit per hour	1.13	0.45
11.	Coefficient of heat transmission for door, Btu per square foot per degree Fahrenheit per hour	0.52	0.52
12.	Calculated heat loss through doors and windows, Btu per hour	63,800.0	27,070.0
13.	Total calculated heat loss from building, Btu per hour	137,570.0	100,840.0
14.	Calculated saving, per cent	....	26.7
15.	Actual saving from tests, per cent	....	21.0

of the structure exclusive of the exposed windows and the front door. The data used for the calculation of the infiltration and heat transmission losses through the windows and door are given in Table 2, for which the coefficients were obtained from The American Society of Heating and Ventilating Engineers Guide 1935. The infiltration coefficients given in Item 8 were based on a well fitted window having 5/64 in. crack and 1/32 in. clearance. A frame leakage of 10.8 cu. ft. per hour obtained from The A. S. H. V. E. Guide 1935, Table 2, page 123, was added to the leakage for windows with and without storm sash, read at a wind velocity of 15 m.p.h. from the curves on page 125 of The A.S.H.V.E. Guide. These totals were then reduced 20 per cent to allow for building up of pressure within the building and the results were multiplied by 0.075 and 0.24 to obtain the coefficients in terms of Btu. per lineal foot of crack per degree Fahrenheit per hour. The infiltration coefficient for the unprotected door was obtained by using the value of the leakage for a poorly fitted window, as recommended. No data were available for the leakage around a storm door, but since the one used closed against felt strips, it was regarded as a weatherstripped door, and the leakage was assumed as one-half of that for a door without weatherstripping. The front door was located in a recess which formed a shallow vestibule when the storm door was installed. The heat loss under these conditions was calculated by using the same coefficient of heat transmission for the two cases, but regarding the door exposed to the outdoor temperature in one case and the mean between the indoor and outdoor temperature in the other.

From Table 2 it may be observed that the calculated heat loss was 137,570 Btu. per hour for the building not equipped with storm windows and doors, and 100,840 Btu. per hour for the building equipped with storm windows and door. This represented a computed saving of 26.7 per cent as compared with the actual saving of 21 per cent shown at an indoor-outdoor temperature difference of 70 F. by the test curves in Fig. 3. This may be regarded as very close agreement considering the uncertainties which necessarily accompany the computation of infiltration losses, and several explanations may be offered to account for the fact that the apparent saving was somewhat greater than the actual. The published coefficients are based on laboratory tests under controlled and readily determinable conditions. In applying these coefficients, the question as to how nearly the actual conditions approximate those stated for the laboratory tests is largely a matter of estimation and judgment.

In the case of the storm windows, the storm sash were positively secured against felt strips. This condition can be readily duplicated and it is probable that coefficients determined from laboratory tests applied reasonably well to the actual installation. Furthermore, the leakage is small as compared with the total heat loss from the building. In the case of the unprotected windows the infiltration depends on the width of crack and the clearance around the frames, both of which are difficult to estimate or measure accurately. This leakage is relatively larger than that around the storm sash, and if it were overestimated it would indicate an apparent saving that would be greater than the actual. It is possible, therefore, that the unprotected windows at the Research Residence were tighter than allowed for in the estimate, thus accounting for the larger apparent saving indicated by the computed results.

The calculations for heat losses do not take into consideration the admission of cold air through doors at the time of entrance. If this loss remained constant in the two installations, it would be a relatively greater proportion of the total heat loss when the building was equipped with storm doors and windows than it would be when the building was not so equipped. Hence neglecting this item in the computations would tend to increase the apparent saving as compared with the actual saving.

The calculated heat losses were based on a wind velocity of 15 m.p.h. in order to maintain consistency with the values of the heat transmission coefficients selected from The A. S. H. V. E. Guide, whereas the actual average wind velocity in Urbana, Ill., in zero weather is somewhat less than this. The wind has a greater effect on unprotected windows than on those protected by storm sash, and at lower velocities the differences in infiltration would not be as great as they would be at higher velocities. This would also tend to indicate an apparent saving greater than the actual.

Fuel Saving Affected by Construction. It is obvious that the percentage of reduction in fuel consumption with and without the use of storm doors and windows is dependent on the nature of the wall construction and the ratio of exposed window surfaces to the net wall surface. For a given room or house, storm windows and doors will effect a larger percentage saving when the wall is well heat-insulated than when it is not. Also, for two rooms of the same size having the same wall construction, but different ratios of window surface to net wall surface, the percentage of fuel saving will be greater when storm windows are applied to the room which has the larger ratio of exposed window surface to net wall surface, than it will be when the storm windows are applied to the room having the smaller ratio.

In this connection, tests of storm windows and doors

made under laboratory conditions are of some interest. These tests were made in the room heating testing plant in the Mechanical Engineering Laboratory at the University of Illinois. This plant[3] consisted of two test rooms, each having two wall exposures of frame construction, erected inside of a large insulated enclosure. The test rooms were heated with steam radiators, and, by means of refrigerating coils in the large enclosure, the two walls of the test rooms could be exposed to any desired air temperature. For these tests the temperature on the outside of the exposed walls was maintaind at 0 F., and the heat loss from the test room was measured by the steam condensation from the radiator. The test room was 9 ft. by 11 ft. with a 9-ft. ceiling, and had two double-hung windows each 2 ft. 6 in. by 4 ft. 6 in., and an exposed door 3 ft. by 7 ft. The ratio of the window area to net wall area was 16.5 per cent and the ratio of the sum of the areas of the windows and door to the net wall area was 31.9

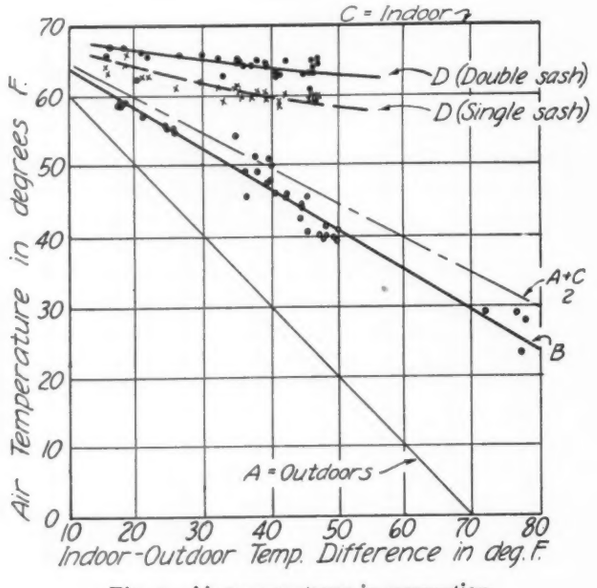


Fig. 4—Air temperatures in connection with storm sash (Thermometer locations indicated by A, B, C, and D. See Fig. 2)

per cent. In these tests the steam condensation required to heat the room to 70 F. at the 5-ft. level was reduced 11.0 per cent when storm windows alone were used, and 31.0 per cent when both storm windows and storm door were installed. The results obtained in the Research Residence, in which the wall construction was similar to that of the laboratory test room, were consistent with those obtained in the laboratory tests. The actual fuel saving was 21.0 per cent, which was intermediate between the reductions in steam condensation of 11.0 per cent and 31.0 per cent shown in the laboratory tests with storm windows alone and with the storm windows and door respectively; while the ratio of the area of openings to that of the net wall was 22.4 per cent in the Research Residence, which was intermediate between the corresponding ratios of 16.5 per cent and 31.9 per cent for the windows alone and for the windows and door in the laboratory test room. The fact that the per cent saving was approximately the same as the ratio of the area of openings to the net wall area in each case is probably only a coincidence, but it is evident that the potential saving increases as the ratio of openings to net wall becomes greater.

The use of storm windows enabled the maintenance of higher indoor relative humidities without condensation on the windows. Observations[4] made at the Research Residence, simultaneously on windows not equipped with storm sash and on two windows provided with storm sash, during a period when the relative humidity indoors was being rapidly increased with a constant outdoor temperature of 26 F., proved that condensation started to appear on the unprotected windows when the relative humidity reached a value of 32 per cent. No condensation appeared on the two windows equipped with storm sash. This agrees very closely with computed curves indicating that, with 40 per cent indoor relative humidity, condensation appears on unprotected windows when the outdoor temperature drops to 35 F., while with storm sash the outdoor temperature must drop to 0 F. before condensation appears. Operation during a whole season with all of the windows protected with storm sash, however, indicated that if there is any appreciable leakage around the inner sash, some condensation will deposit on the glass in the storm windows in extremely cold weather when high relative humidities are maintained indoors.

In addition to reducing the heat loss from the building, storm windows were also effective in reducing the downward draft of cold air usually present with unprotected windows.[5] This is shown in Fig. 4 from which it may be observed that the temperature of the current of air coming down over the windows, as measured at *D* (see also Fig. 2) was approximately 3 F. greater for the windows equipped with storm sash than it was for those not so equipped.

The immediate effect of this reduction in draft was an increase in the air temperature in the living zone of the room, particularly near the floor. The observed room temperature gradients in the dining room are shown in the left hand portion of Fig. 5 for the case (*B*) in which the windows were not protected and for the case (*C*) in which storm windows were used. It may be noted that the air temperature gradient from the 5-ft. level to the ceiling was not affected by the installation of storm windows.

With a fixed setting of the controlling thermostat, there was a marked reduction in the total time of fan operation in the forced-air system, accompanying the reduction in fuel saving when the storm windows were installed. For an average outdoor temperature of 25 F., as illustrated in the right half of Fig. 5, the ratio of the time of fan operation to the total time was approximately 40 per cent without storm windows and 30 per cent with storm windows. Since the percentage of time of fan operation compared to total time varies with different plants and with different settings of the controlling thermostats, the numerical values of these percentages can not be regarded

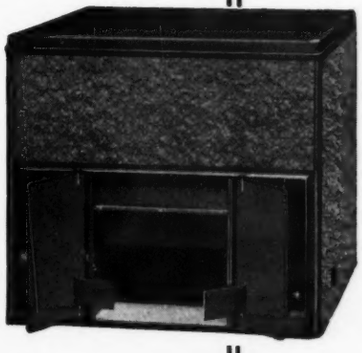
[3]University of Illinois, Engrg. Experiment Station, *Bulletin No. 223*, Chapter II, pp. 11-17 and Chapter IX, pp. 62-66.

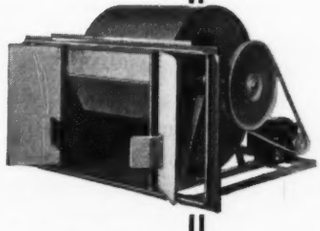
[4]University of Illinois, Engrg. Experiment Station, *Bulletin No. 266*, Chapter XI, pp. 115-121.

[5]Loc. cit.

(*Continued on page* 128)

AIR-PAK





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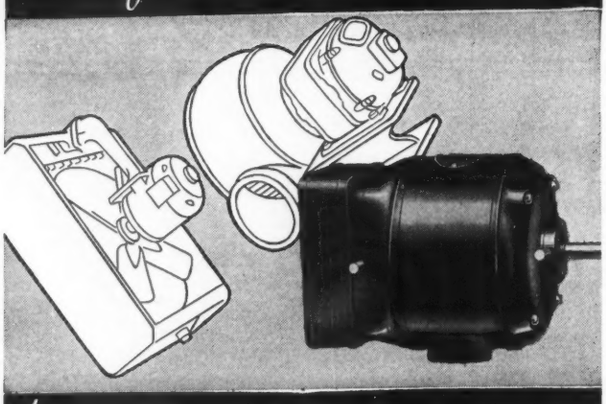

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Voorhees Friction Chart

(*Continued from page* 90)

degrees it becomes 1.890 cubic feet. Averaging these assumed maximum and minimum air duct temperatures, we may safely assume that the volume of air flowing in the duct system will be

$$\frac{1.1512 + 1.1890}{2} = 1.1701 \times \text{the 70-degree volume}$$

This average value is accurate enough for most jobs, and we have the rule:

RULE: Item VI–T-8 = (Item VI-T-7) × 1.17.

For the problem we're considering, this becomes $1.17 \times 500 = 585$ C.f.m. at duct temperature.

Items VI-T-9 and 10 are read from the chart and we'll pass them for the present and consider instead, the pipe which branches off from the trunk at D. This is designated as Branch Section DB and is so entered as Item VI-B-1.

There are 10 running feet of pipe as shown on the plan and we enter this as Item VI-B-2.

There is one 90-degree bend where the pipe branches off from the trunk and a second elbow where it turns upward into an assumed floor register box, making two 90-degree elbows. Again allowing 10 feet of straight pipe as the equivalent of one elbow so far as friction is concerned, we have $2 \times 10 = 20$ which we enter as Item VI-B-3.

Item VI-B-4 is the sum of Items VI-B-2 and VI-B-3.

If the friction pressure loss from D to B in the branch is the same as the pressure loss in the trunk from D to A, then each of the registers A and B, will get its proper proportion of air without the use of a damper at D to regulate the flow. This is very important to know; it is the principal justification for the use of the friction pressure chart method of designing a duct system. Furthermore it explains why systems accurately calculated and designed in strict accordance with the friction pressure loss method have been known to operate perfectly without a single volume damper.

Such systems which will operate without dampers represent the engineer's IDEAL; but it's an ideal seldom attained and in the rare cases when it is attained, it's partly LUCK.

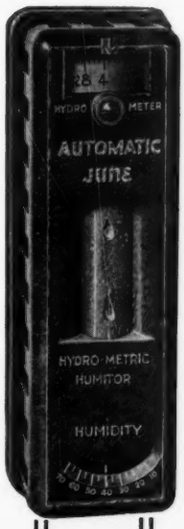
RULE: Item VI-B-5 is the same as Item VI-T-5.

Notice that while the pressure loss in Branch Section DB is numerically the same as that in Trunk Section AD, the pressure loss *per hundred feet* will not be the same unless it happens that the total equivalent lengths of AD and DB are the same.

The pressure loss per hundred feet in the Branch Section (Item VI-B-6) will be according to the following rule:

$$\text{Rule (Item VI-B-6)} = 100 \times \frac{\text{Item VI-B-5)}}{\text{Item VI-B-4)}}$$

For this particular problem, this becomes $100 \times \frac{0.0294}{30} = 0.098$ and which is entered as Item VI-B-6 in the table.



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Automatically causes room humidity to become lower as weather gets colder, therefore—

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The last word in scientific humidity control.

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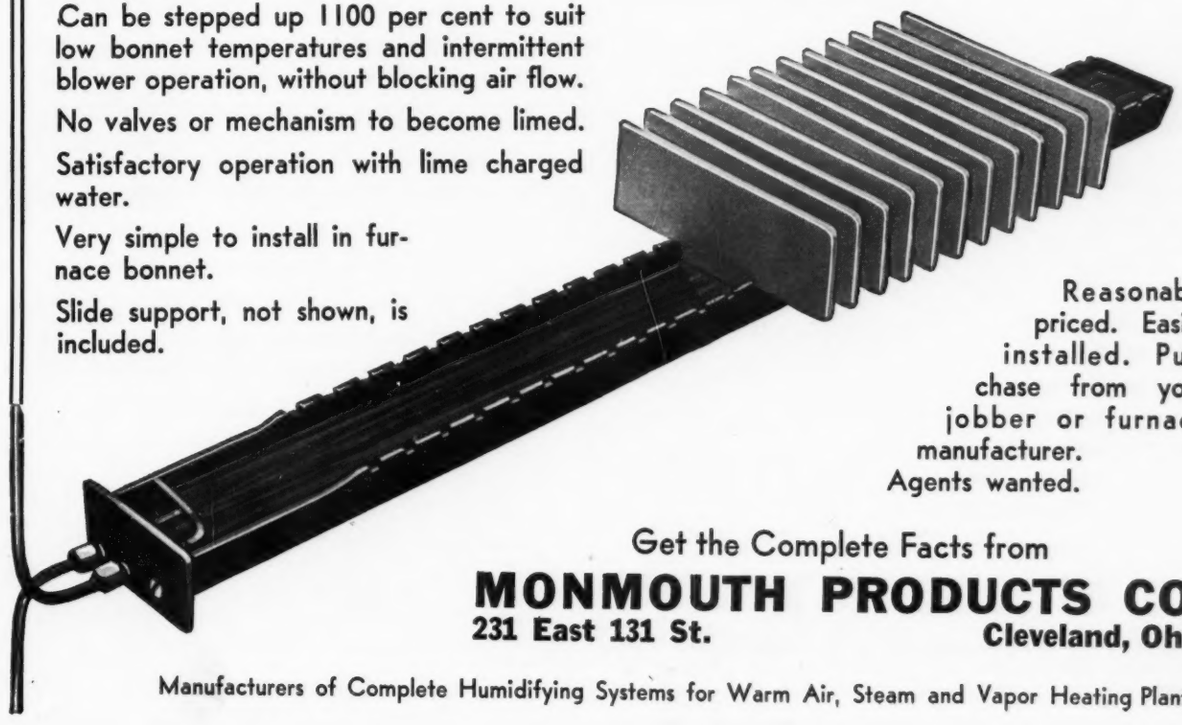

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Item VI-B-7 is listed in the tabulation in Figure 1 as 300 C.f.m. and is so entered in the table.

The same rule as given for Item VI-T-8 applies to Item VI-B-8 and for the problem being considered here it is $1.17 \times 300 = 351$ C.f.m., the volume of the air flowing if measured at the probable average duct temperature.

How to Use Chart

We are now ready to turn to the chart itself and we'll take first, the trunk section AD and determine the round pipe diameter to be entered as Item VI-T-9 in the table. The procedure is as follows:

First: On the C.f.m. scale at the bottom of the chart (Figure 2) locate the point representing the C.f.m. recorded as Item VI-T-8 which for this problem is 585, and from this point project a line vertically upward.

Second: On the friction scale at the left of the chart, locate the pressure loss per 100 feet which is recorded as Item VI-T-6 which in this case is 0.072, and from this point project horizintally to the right to intersect 585 C.f.m. vertical line.

This point is found to lie between the 12-inch and 14-inch round pipe diameter lines. Its location with respect to these two lines is seen to represent approximately, a round pipe 12.5 inches in diameter and this will be entered as Item VI-T-9.

With respect to the other set of inclined lines on the chart, we find our point of intersection to lie between the lines representing respectively 600 f.p.m. and 700 f.p.m. We estimate that its position is about six tenths of the distance from the 600 to the 700 line and therefore that it represents a velocity of about 660 F.p.m. which we record as Item VI-T–10.

In a like manner, we locate on the chart (Figure 2) the point representing 361 F.p.m. (Item VI-B-8) and 0.098 inches (Item VI-B-6). We find that its location with respect to the pipe diameter lines indicates a diameter of very nearly 9.9 inches which we enter in the Table as Item VI-B-9. Its relation to the velocity lines indicates a velocity of about 650 F.p.m. which we enter as Item VI-B-10.

Having completed sizing the trunk and branch sections most remote from the furnace, we now turn our attention to trunk section DE and in taking this step we must note a distinct difference between the friction pressure loss method which is the precise engineering method of sizing ducts and the "percentage reduction method" which is permitted by the rules in the Mechanical Warm Air Heating Code.

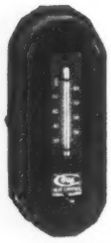
The percentage reduction method whereby the cross sectional area of a trunk is 10% less than the combined cross sectional areas of the branches which it supplies, is a crude method if viewed from the standpoint of correct engineering practice. *This statement is not to be taken as a criticism of the Mechanical Warm Air Heating Code.*

Mechanical Code Limitations

In formulating the Mechanical Heating Code, the Code Committee of the Furnace Blower Manufacturers' Association who first undertook the task of compiling a

COOK EXHIBIT 515 HEATING AND VENTILATING EXPOSITION

COOK THERMOSTATIC CONTROLS for GRAVITY, FORCED AIR and ZONE INSTALLATIONS



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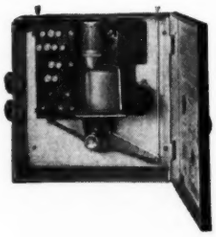

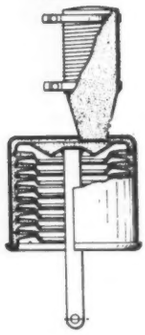

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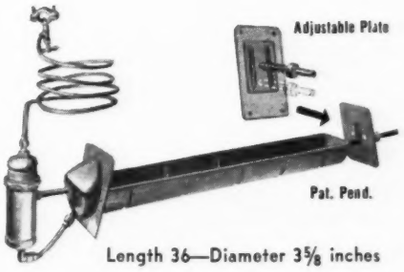
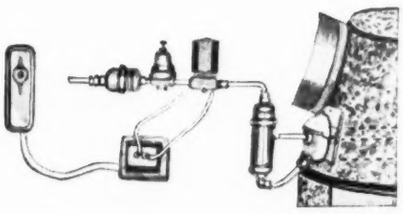


Length 36—Diameter 3⅝ inches



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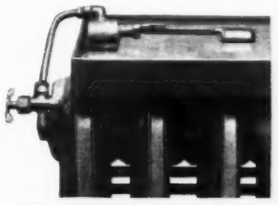
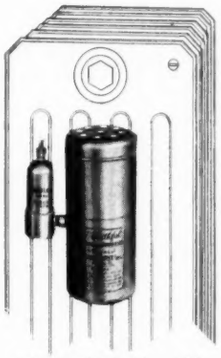

No. 53 Water Pan Feeder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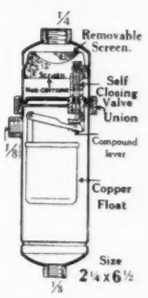

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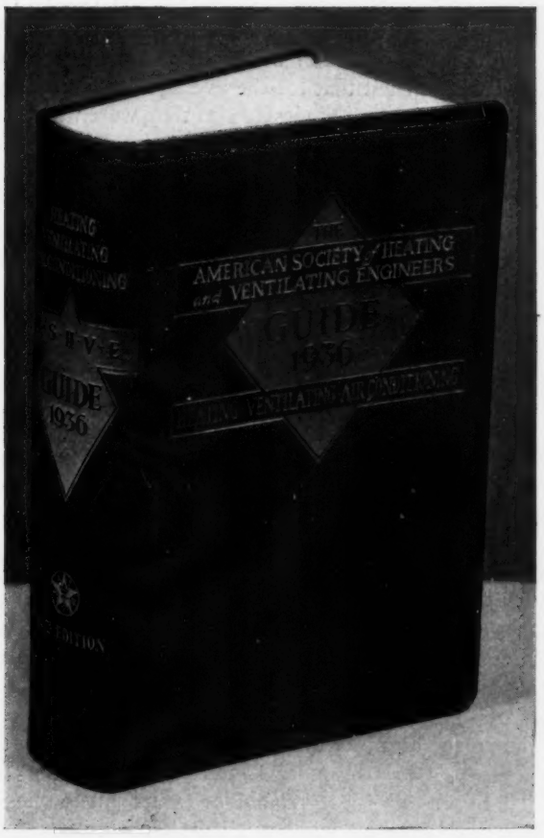

THE GUIDE 1936

for

HEATING
•
VENTILATING
• •
AIR CONDITIONING
• • •

READY for DELIVERY JANUARY 25

CONTENTS of the 1936 EDITION

Chapter

1. Fundamentals of Heating and Air Conditioning
2. Refrigeration
3. Ventilating and Air Conditioning Standards
4. Natural Ventilation
5. Heat Transmission Coefficients and Tables
6. Air Leakage
7. Heating Load
8. Cooling Load
9. Central Air Conditioning Systems
10. Cooling Methods
11. Humidification and Dehumidification
12. Unit Heaters, Ventilators, Coolers, and Air Conditioners
13. Railway Air Conditioning
14. Temperature and Humidity Control
15. Air Pollution
16. Air Cleaning Devices
17. Fans
18. Sound Control
19. Air Distribution
20. Air Duct Design
21. Industrial Exhaust Systems
22. Fan Systems of Heating
23. Mechanical Warm Air Furnace Systems

Chapter

24. Gravity Warm Air Furnace Systems
25. Boilers
26. Chimneys and Draft Calculations
27. Fuels and Combustion
28. Automatic Fuel Burning Equipment
29. Heat and Fuel Utilization
30. Radiators and Gravity Convectors
31. Steam Heating Systems
32. Piping for Steam Heating Systems
33. Hot Water Heating Systems and Piping
34. Pipe, Fittings, Welding
35. Water Supply Piping and Water Heating
36. Insulation of Piping
37. District Heating
38. Radiant Heating
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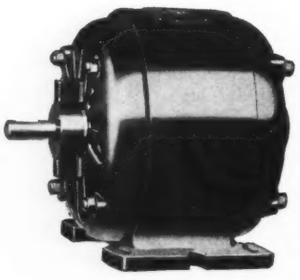

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practical set of rules and the Installation Code Committee of the National Warm Air Heating and Air Conditioning Association who took over and continued the work, both felt that for the average mechanical system in a residence of moderate size they were warranted in sacrificing technical accuracy for the sake of simplicity. Experience has proved that the percentage reduction method is satisfactory and acceptable for installations of moderate size in residences. Experience has further shown that those heating men who design a limited number of forced air systems will, and do, use the simple, approximate percentage reduction method whereas they will not take the time to learn how to apply the more accurate friction pressure loss method.

But a rapidly growing number of heating contractors are now handling a volume of forced air heating work which justifies the time and attention needed to learn and understand the correct application of the friction pressure loss method of sizing ducts; hence, this article explaining the use of the friction pressure chart.

Having filled in the first column of Item VI on the data sheet, resulting in determination of sizes of trunk section AB and branch section DB we now start the second column with Item VI-T-1 heading this column DE, the next section which we are to size.

The plan, Figure 1, shows the running feet of pipe to be $2 + 6 + 3 = 11$ and we enter this as Item VI-T-2.

There are two 45 degree angles equivalent to one 90° elbow and since we allow ten running feet of pipe for each right angle turn, we enter 10 as Item VI-T-3.

Item VI-T–4 is the sum of Item VI-T-2 and VI-T-3 which gives our total equivalent length as 21 feet.

Since section DE is a section of the main trunk line and since this plant is being designed for a friction pressure loss of 0.072 per hundred feet of trunk line, the pressure loss in section DE which is 21 feet long will be $0.21 \times 0.072 = 0.015$ which is entered as Item VI-T-5.

In the case of every section of the main trunk line the pressure loss *per hundred feet* in that section will be the same as Item V and we, therefore, enter as Item VI-T-6 for trunk section DE, 0.072.

The c.f.m. (measured at 70°) handled by trunk section DE will be equal to the c.f.m. handled by trunk section AB and branch DB which in this case amounts to $500 + 300 = 800$ and we enter this as Item VI-T-7.

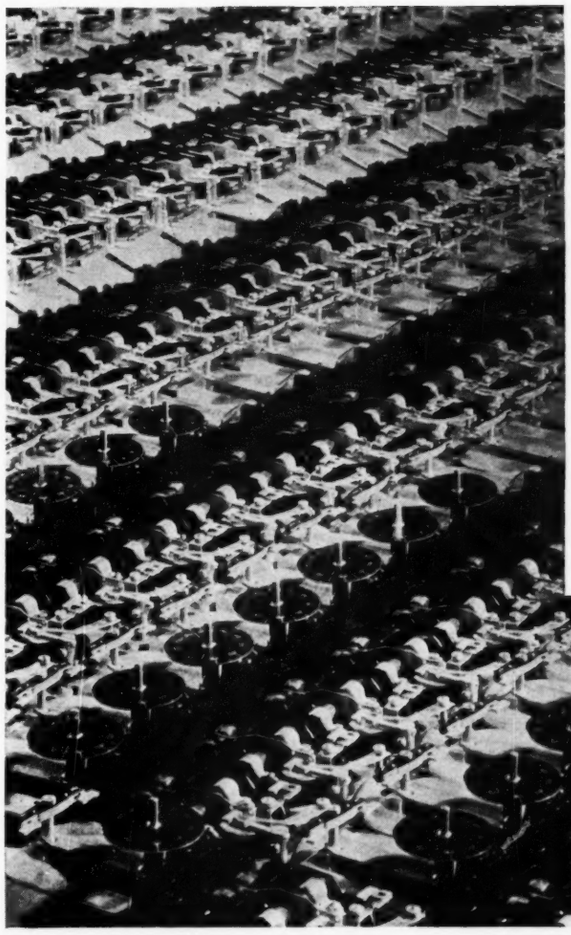
To determine the corresponding c.f.m. after allowing for the increased volume of the air due to its higher temperature as previously explained, we multiply 800×1.17 and enter the product 936 as Item VI-T-8.

The required round pipe diameter for this trunk line section (Item VI–T-9) will be found on the chart, Figure 2, by locating 936 on the c.f.m. scale at one edge, 0.072 on the pressure loss scale at the other edge and projecting on the chart perpendicularly from these points as previously explained for trunk section AB and branch section DB. We find in this way that section DE will be a 15-inch round pipe.

The air velocity in the section (Item VI-T-10) is found to be 750 by following the method previously explained for determining duct velocity.

It is suggested that the reader who is interested in

(*Continued on page* 118)



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See the new FRIEZ EFFECTISTAT and COMFORTROL at the Heating and Ventilating Exposition (Booth # 320) or write Makers for Bulletins # E and # C.

*Note: You will also be interested in the FRIEZ WINDOWSTAT, which at low cost solves the winter window condensation problem (Bulletin # W).

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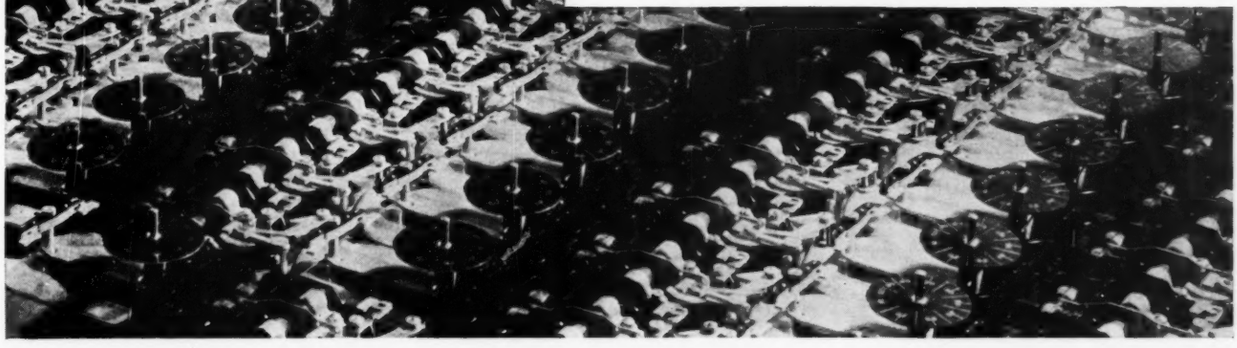

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Konzo on Resistance

(*Continued from page* 93)

responding velocity head of the air may be determined from Table I, item G, column 4 (pressure loss is 0.04).

Tabulating these individual items of frictional resistance, we obtain the following result:

Item	Description	Velocity f.p.m.	Volume c.f.m.	Refer to Table	Pressure Loss Inches Water
a.	Inlet grille.....	400		I	0.010
b.	Return duct (0.6x0.07)...	600		I	0.042
c.	Filters (service condition)		400	II	0.06
d.	Casing, baffled.....		1600	II	0.04
e.	Warm air duct (0.7x0.16)	800		I	0.11
f.	Register			I	0.04
g.	Register velocity head....	800		I	0.04
					0.342

Total Pressure on fan = 0.342 in.
(sum of items a to g incl.)
Pressure Loss = 0.302 in.
(sum of items a to f incl.)

This latter term is practically equivalent to the "static pressure" on the fan. The fan for this typical system should be capable of "delivering 1600 cu. ft. per minute against a static pressure of 0.3 inches."

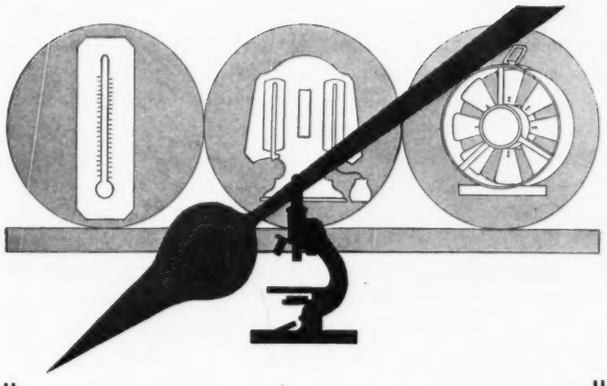
General Discussion

1. It may be noted from the preceding example that the process of determining the frictional resistance for a forced-air system consists of adding the frictional resistances of each portion of the duct system on both the suction side and delivery side of the fan. The method shown here is generally applicable to all systems, large or small. The values shown in Tables I, II, and III have been selected by the author from a mass of data, some of which will appear in later articles. Where precise values for a given unit are obtainable from manufacturers' catalogues, such values should be used in preference to those shown in the tables. For example, if the air filter to be used by the installer is much more loosely packed than the viscous fibre types, which are in common use, the resistance value will probably be smaller than that shown in the table.

2. It should be emphasized again that high air velocities create much greater resistance to air flow than do low velocities. It also follows from this statement that systems designed for high air velocities will require more careful engineering work than systems designed for low velocities.

3. In the above example, and in most engineering calculations of pressure losses, it is assumed that all the losses have been accounted for. Under some conditions, such an assumption may be erroneous. The values as determined in the preceding discussion are based primarily on the supposition that the workmanship of the sheet metal duct system is "good" or "excellent."

Faulty workmanship, improper take-offs, bad connections, and faulty transitions will impose additional resistance to air flow that may be quite large in magnitude. There is no adequate method of estimating the



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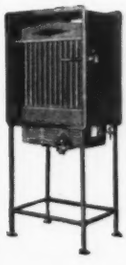

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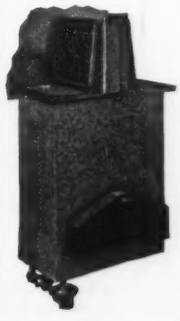

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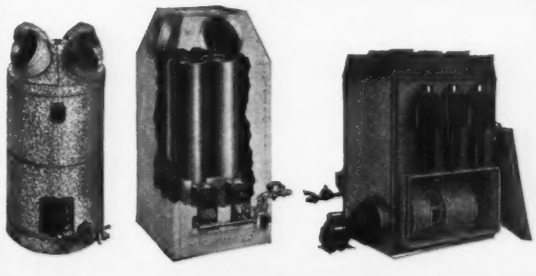

Pacific

GAS HEATING HEADQUARTERS

effect produced by faulty design and bad workmanship. The succeeding article will show some of the factors that distinguish good design from bad.

4. The author is of the opinion that standardization of the principles of design of a forced-air heating system will become more prevalent in the coming years. Such standardization will create a demand for:

a. Completely equipped units that include fan, filters, furnace, baffling, casing, and bonnets.

b. Complete information in regard to the pressure losses of the completely equipped unit.

In other words, the estimation and guesswork of pressure losses will have to be reduced to a minimum. Each manufacturer of a forced-air furnace heating unit should determine by test the "pressure losses of the unit" so that the designer will not have to attempt to estimate the losses through air filters, inlet to fan, inlet to casing, casing losses, and bonnet outlet.

These losses can all be measured in the assembled unit.

Resistance Should Be Specified

The rating of the heating units should state that the fan will be able to deliver a given air volume, of say 1600 c.f.m., for a duct resistance of a given amount, say 0.15 inches. The necessary estimate of pressure losses will then consist of:

Item a. Grille inlet loss
Item b. Return duct loss
Item e. Warm-air duct loss
Item f. Register loss

When that time comes when all manufacturers will provide the information in this manner, some of the difficulties that now confront the designer and installer will have been removed.

5. In the preceding example no acount was taken of the possible addition of a cooling coil, or other auxiliary equipment. Table III gives the frictional resistance of a common type of finned tube coil for various velocities through the face area of the coils.

It may be noted that the pressure loss through a cooling coil system may become prohibitively large for high velocities of air flow or for very deep sections of coils. It is apparent that the use of such coils should be considered only after their effect on the pressure loss of the entire system has been duly investigated.

In fact, the addition of a pressure loss that ranges in magnitude from 0.1 inch to 0.5 inch may so load a fan in a given installation that the air volume delivery of the fan would be reduced to a point where the system would be practically inoperative. Similarly the addition of any other auxiliary equipment should be considered from the standpoint of the resistance which it would impose on the fan in the system.

Voorhees Friction Chart

(*Continued from page* 114)

learning how to use the friction pressure chart, determine from the foregoing explanations, the data to be entered on the data sheet for the branch section EC. Then check this against the data which has been entered on the accompanying specimen data sheet.

Turning now to the main trunk section EF, we enter

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Our sheet metal shop is one of the largest and best equipped in the country. For thirty eight years we have been making quality heating pipe and fittings and all accessories used on a warm air heating job.

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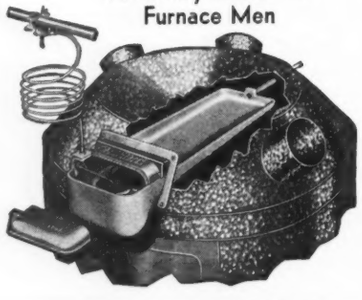

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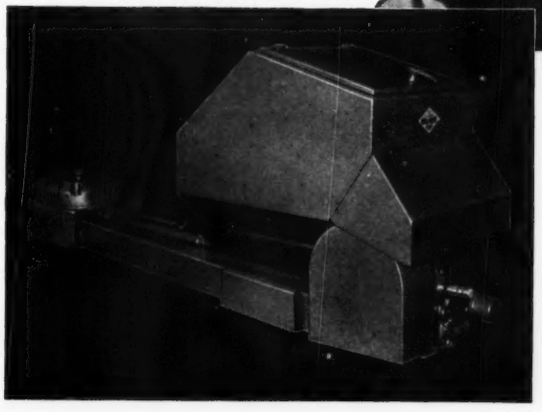

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Will-Burt Stokers actually have the features and qualities that give home owners what they are looking for in economical, convenient automatic heat. That is why Will-Burt dealers can conscientiously and successfully sell against any competition, be it based on price, appearance, performance or reputation.

The Will-Burt is not just another stoker. It is designed by a firm specializing for nineteen years in the manufacture of heat regulating equipment for power plants. Automatic air control on small stokers was pioneered by the Will-Burt Company and the original, efficient control is found only on Will-Burt Stokers.

The Will-Burt line includes a wide range of types and sizes for domestic and commercial installations.

We shall be glad to explain our proposition to dealers who are willing to give the Will-Burt line the kind of representation it deserves.

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The Will-Burt Co.

Automatic Coal Burner Division

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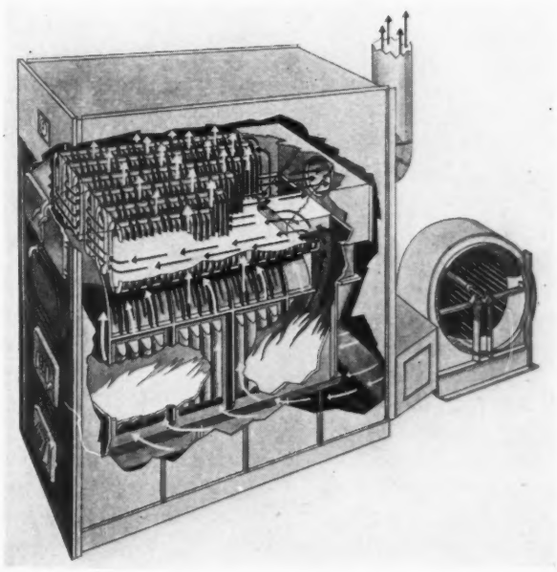
The ACME HEATER

"It's in the Fins"



Jan. 3rd, 1936

PHYSICAL DATA—LARGE SERIES

Size No.	Dimensions			Grate sq. ft.	Heat Surf. sq. ft.	Free Area sq. ft. Min.	Free Area sq. ft. Max.	Wt. Lbs.	Max. Capacity Btu.
	Length	Width	Height						
7	6'-6"	4'-0"	7'-0"	10.31	260	6.55	10.25	5900	900,000
8	8'-1"	4'-0"	7'-0"	11.91	340	7.73	12.50	7000	1,100,000
9	9'-8"	4'-0"	7'-0"	13.06	430	8.91	14.75	8000	1,300,000
10	11'-3"	4'-0"	7'-0"	14.43	500	15.82	22.62	9300	1,500,000

JUNIOR SERIES

2	4'-6"	3'-6"	5'-8"	3.9	136	4.7	4.7	3200	350,000
3	6'-0"	3'-6"	5'-8"	6.1	183	5.9	6.9	4800	527,000
4	7'-6"	3'-6"	5'-8"	7.2	230	7.1	9.1	5000	634,000
5	9'-0"	3'-6"	5'-8"	9.3	280	8.3	11.3	6000	800,000

Note: For Automatic Firing Add 10% to Ratings Given.

Burns Any Kind of Fuel

The design of an all cast iron, direct transmission heater, such as the Acme, is not dependent upon the kind of fuel to be used. Any type of fuel may be burned. Suitable grates may be provided so that bituminous, semi-bituminous, anthracite coal, or other solids may be used with equal efficiency. Replacement of grates and linings by proper refractory material permits the use of automatic stokers on oil burning equipment.

Large Combustion Chamber

The Acme Heater provides ample space for the ignition of gases of combustion, regardless of the kind of fuel used. The unusually large combustion chamber, acting as "primary" heating surface, effects a very efficient transfer of heat, because of the great temperature difference between the burning gases inside the chamber and the air passing over the outside surface.

Efficient Radiator Section

Although the heating surface of the combustion chamber is large and efficient, still more heat must be extracted to obtain satisfactory overall efficiency. An inspection of the "phantom view" above will reveal how the gases of combustion enter the rear smoke chamber, flow to the front of the heater, and return again to the smoke-box. It is evident that the gases are held in intimate contact with the heating surface, six times the length of the heater, before they are permitted to escape.

High Ratio of Heating Surface to Grate Area

The radiator tubes are covered with extended surfaces, or fins, typical of those used on indirect heating coils. The long, oval tubes of the radiator provide an exceptionally large heating surface and, when combined with the surface of the combustion chamber, afford a remarkably high ratio of heating surface to grate area.

Balanced Construction

The construction of the Acme Heater provides ample free area and allows proper velocity of the air to be heated. Moreover, this air is brought into direct contact with as much heating surface as possible, resulting in the Acme of Efficiency.

ACME HEATING & VENTILATING CO., Inc.

4224 LOWE AVENUE CHICAGO, ILL.

this trunk section designation as Item V-T-1 in the third column of the sheet and record as Item VI-T-2 the 15 running feet of length shown on the plan.

There is no elbow in the duct itself, but at the point F the air makes a 90° turn from its vertical movement through the furnace to the horizontal travel in the duct and we consider this as a duct elbow, entering as Item VI-T-3 the 10 equivalent feet of pipe.

Item VI-T–4 is the sum of Items VI-T-2 and VI-T-3.

Item VI-T-5 the pressure loss in the section is determined in the same manner as previously explained and for this section of the trunk it is 0.25 times 0.072 = 0.018.

The c.f.m. measured at 70°, Item VI-T-7, will be the sum of the c.f.m. carried by the trunk section DE and the branch section EC amounting to 800 + 400 = 1200 c.f.m. measured at 70°.

Correcting this for temperature as previously explained, we enter 1404 as item VI-T-8.

Items VI-T–9 and VI-T-10 are determined as previously explained and we find that this section of the trunk will be a round pipe 17.8 inches in diameter and the corresponding air velocity in the section will be 840 F.p.m.

Houses Without Basements

(*Continued from page 97*)

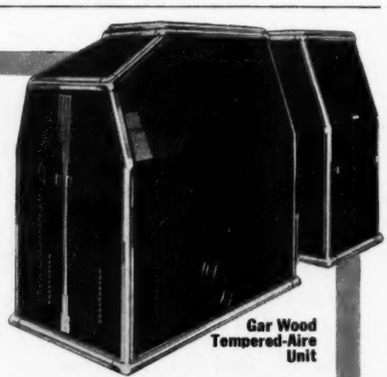
eases is warmth accompanied by pure, fresh air—not recirculated air which carries germs and bacteria from other rooms within the hospital or house.

"Some argue that natural infiltration will provide a sufficient amount of fresh air, which, combined with the recirculated air will produce a desirable result for air supply. We believe that there is no difference whether you take the cold air in through a blower or allow it to come in through the cracks around doors and windows; the B.t.u. loss is just the same. By the use of fresh air from the outside there is this certainty, that cold drafts around windows and doors, and cold air rushing across the floors toward a cold air return grille, are eliminated.

"The plans for the Casa de Tempo installation at the San Diego Fair show two furnaces; one on the first floor and one on the second. We call attention to the fact that the first floor furnace is supplied with fresh air from the outside, as well as return air which was brought from the main hall, the living room and dining room. The second floor furnace is supplied with air by means of a plenum return from the first floor, the duct leading up to the furnace through the floor.

The control system consists of a room thermostat, a blower control and a modulating gas valve. The thermostats are located in the most used rooms. When heat is needed the thermostat opens the gas valve in the furnace. The temperature in the plenum builds up and when the temperature reaches 125 degrees the blower starts. When the temperature in the bonnet reaches 200 degrees a bonnet control modulates the gas flow and thereby keeps bonnet temperatures within the range 125-200 degrees. When the thermostat is satisfied the gas burner is closed, but the fan continues to run until the bonnet temperature drops back to 125 degrees when the blower stops.

GET YOUR LAYOUTS
FROM Gar Wood DEALERS

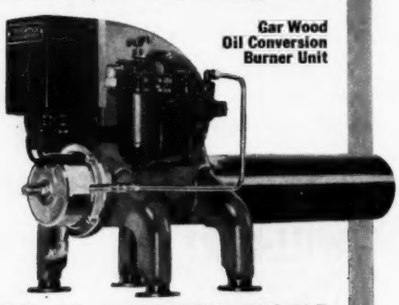

Gar Wood Tempered-Aire Unit

● Take your jobs to the Gar Wood dealer. Have him make an engineering layout for you to figure your sheet metal cost. The Gar Wood dealer wants to cooperate with established sheet metal workers in getting residential oil heating and air conditioning business. ● You will be given prompt attention and your interests will be duly safeguarded during sale negotiations. In this manner, you can render prompt and efficient service and build a better and more satisfactory business. Gar Wood literature is interesting and valuable. Write today for HOME HEATING data. There is no obligation. Gar Wood Industries, Inc., Air Conditioning Division, 7924 Riopelle Street, Detroit, Michigan.


Gar Wood Boiler Burner Unit

Gar Wood

DEALERS ARE TRAINED HEATING MEN

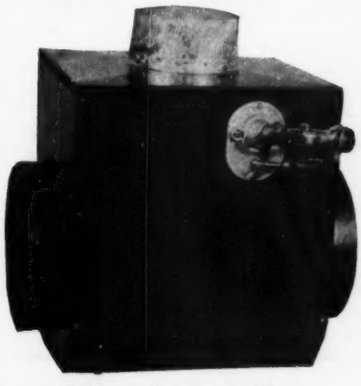

Gar Wood Oil Conversion Burner Unit

ANY HOUSE WITH A GAR WOOD SYSTEM IS A BETTER HOME

The AUTOMATIC DRIP HUMIDIFIER

The most important factor in any humidifying apparatus is the control valve. Upon this vital part rests the responsibility of keeping the household hale and hearty and free from colds the year round. In the AUTOMATIC DRIP Humidifier the valve seat and needle are of rust resisting Monel Metal and the valve itself is placed *outside* the pan to further insure against the danger of corrosion. This arrangement saves the time and bother of service calls, being easily accessible to the home owner for adjustment.

The final factor which draws the line between a thoroughly modern heating system and any common, ordinary furnace installation is the AUTOMATIC DRIP HUMIDIFIER. Entirely automatic, with no electrical parts to get out of order, and positively noiseless, it is that powerful factor which will help clinch your sales campaigns during the year. It can be furnished in four sizes and lengths and is so simple it can be installed by any furnace man. Complete instructions for installing and operating are enclosed in every package.



We can also supply the humidifier as an integral part of the smoke pipe as shown. Pipe and vapor pan are of 14 gauge steel. A six inch warm air pipe carries the humidity into the room, and another six inch inlet is provided in the bottom to create circulation. Passage of the smoke is not obstructed because the humidifier is part of the smoke pipe itself.

Write today for particulars regarding these low priced job clinchers. Every minute you delay means just that much more money slipping out of your reach on furnace installations during the year. Upon receipt of your letterhead, literature and sales helps will be forwarded to you.

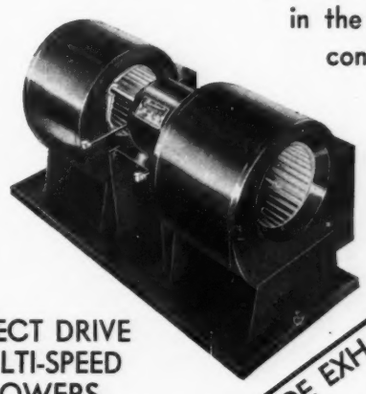
AUTOMATIC HUMIDIFIER CO.

CEDAR FALLS, IOWA

Peerless

CORDIALLY INVITES YOU TO BOOTH 244—CHICAGO, JAN. 27-31

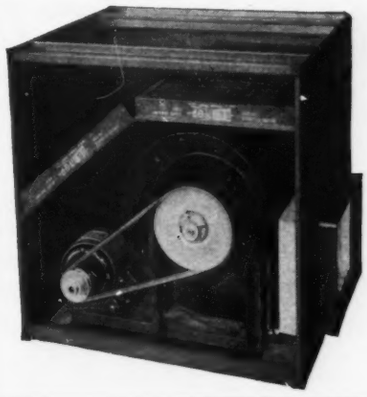
Our exhibit will be of interest to all who are in the field of air conditioning.



DIRECT DRIVE MULTI-SPEED BLOWERS.

MULTI-BLADE EXHAUST FANS

A COMPLETE RANGE OF CAPACITIES. SINGLE SPEED OR WITH MULTI-SPEED CONTROLLER.



BLOWERS
MULTI-SPEED
DIRECT DRIVE
AND
BELT DRIVE

THE PEERLESS ELECTRIC COMPANY
FAN & BLOWER DIVISION, WARREN, OHIO

Please send catalog of blowers.

Name .....

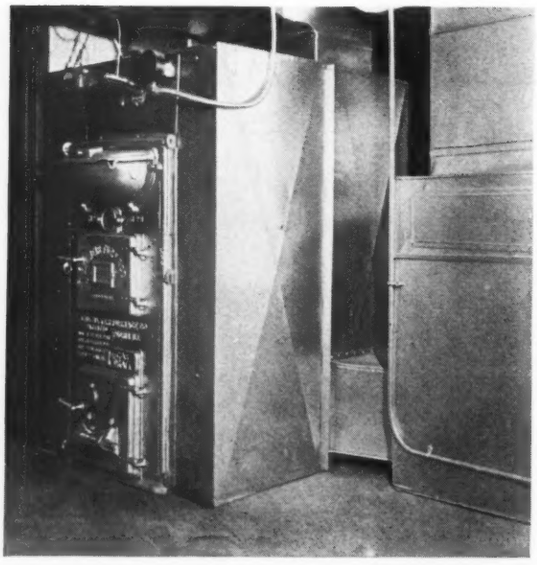
Street .....

City ..... State .....

DID YOU CALL ON US AT BOOTH 244

Survey Sales Plan

(*Continued from page* 95)



Typical heating installation made from a survey showing new furnace, winter air conditioning unit and class of workmanship.

the owner has actually given permission and knows that the survey was made.

This survey then forms the basis for the sale to follow. From the survey the recommendations for repair, remodeling, new apparatus are made out in the form of a written presentation which is taken personally to the owner. If the salesman needs help, one of the firm accompanies the salesman on the call in which the presentation is delivered.

The presentation forms the basis for the job as sold. In addition to the flat $2.50 for the survey and presentation, the salesman is paid a commission on all work developed from the presentation. The percentages vary as follows: 15 per cent on all insulation, regulators, humidifiers, specialties; 10 per cent on all boilers, furnaces, oil burners, stokers, oil burning furnaces. A flat sum of 75 cents paid for each cleaning job sold; $2.50 for each furnace rebuild.

Equally interesting is the method of routing salesmen. At present there are ten salesmen working in all three divisions. Each salesman can sell all the items handled by the company. Thus a salesman can sell a new furnace, a stoker, an insulation job and collect his commission for each. In the past the company used to give each salesman a territory.

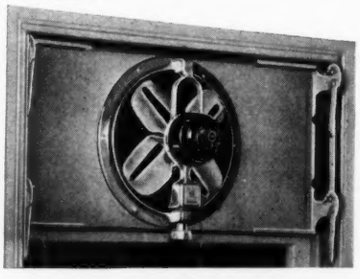
"We found this didn't work," says Dan Schmidlin, "because a salesman might meet a friend at church and upon being told that the friend had a furnace which needed some repairs would have to say, 'I'll tell Smith about it; that's his territory.' We lost more business because of this than the scheme was worth. Also a closed territory gave us no control over the salesman's energy. He might lay down on the job and still claim all the work coming out of his territory. We finally

EXHAUST FAN

DUAL-AIR POWER FANS
Will Increase Your Earnings

An efficiency in fan performance you have never before realized possible, coupled with non-rusting, non-corroding, all cast aluminum streamline construction. Powered with General Electric fully enclosed thrust bearing motors. This new slotted blade fan moves more air with less power—easy to install, cheap to operate, lasts a lifetime and quiet in operation.

A kitchen type fan in window panel which swivels air in or air out. An Interlock Panel allows for full window movement.



DUAL-AIR POWER FANS CAN NOT BE OUT-PERFORMED

INDUSTRIAL APPLICATIONS

For exhausting cooking odors, tobacco smoke from clubs, stores or restaurants. To change the air in factories, offices. For general ventilation problems. Ask for prices.

ATTIC COOLING

The most effective summer cooling attic system, representing the lowest cost residential comfort service, is available to the sheet metal contractor. Write for particulars.

GENERAL REGULATOR CORPORATION
2608 W. ARTHINGTON, ST., CHICAGO, ILL.

This Great Government Building

U. S. Department of Agriculture

Aronberg & Fried, New York
General Contractors
W. G. Cornell Co., New York
Heating Contractors

INSTALLED

AEROFIN

FAN SYSTEM HEATING AND COOLING SURFACE

AEROFIN standardized light-weight heating surface meets exacting government specifications for efficiency, reliability and permanency.

For this reason it is the logical choice of architects, consulting engineers and contractors for all fine buildings. In fact, wherever dependable fan system heat surface is required, put Aerofin in your specifications.

Constant research keeps Aerofin always up-to-the-minute and out in front. It is surprising how Aerofin design anticipates the future. In Aerofin you will find everything you have wished for in forced fan heating systems. Let us prove it!

A complete line of equipment for heating and cooling is at your service. The home office in Newark or any of our branch offices will gladly send complete descriptive literature or render prompt personal and efficient technical co-operation. Simply write to the address below.

AEROFIN
is sold only by
Manufacturers
of Nationally
Advertised
Fan System
Apparatus.
List upon Request

AEROFIN CORPORATION
850 Frelinghuysen Avenue
Newark NJ
Chicago Detroit New York Philadelphia

M-VB

HUMIDIFIER VALVE

IT MAKES A FURNACE MODERN

It takes AUTOMATIC humidity control to make a warm-air furnace really up-to-date. That's why furnaces equipped with the M-VB Humidifier Valve sell better. They're modern. They furnish comfortable humidified heating automatically. They're better for health, because the pan never runs dry. And they're more convenient—for they do away with periodic manual filling of the water pan.

Most furnaces with the old-fashioned hand-filled pan can be equipped with an M-VB Valve easily and quickly. Four separate models allow for the simplest insertion—top of pan, side of pan, with float position set or adjustable.

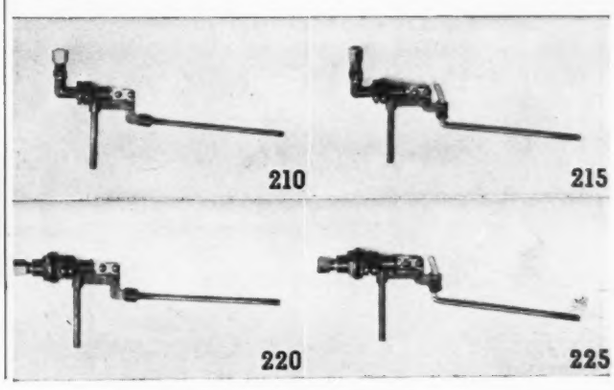
The M-VB's action is ENTIRELY AUTOMATIC. It maintains the proper water level at all times without attention. And the famous M-VB quality construction assures it long life and trouble-free service.

All fittings for a complete installation come packed in a neat box, with full directions. Investigate the possibilities of this real modernizing sales-aid. A letter to the address below will bring particulars.

M-VB

SCOVILL

MORENCY-VAN BUREN DIVISION
Scovill Manufacturing Company
STURGIS MICHIGAN



abolished all territories. A salesman may range from one end of the county to the other.

"We have not found this wasteful of time. It might be if we turned the man loose, but we keep a daily report card. (See illustration.) Each salesman must fill in his next day's calls completely hour by hour before he leaves the office the night before. On the other side, he must fill in where and when he spent the day. Thus, we make the men plan their day and save steps and, further, see to it that he actually makes the calls he plans to make. This report is no idle gesture. We believe in controlling the salesmen's time and if they don't lay out enough work and really carry out their schedules, we get another salesman."

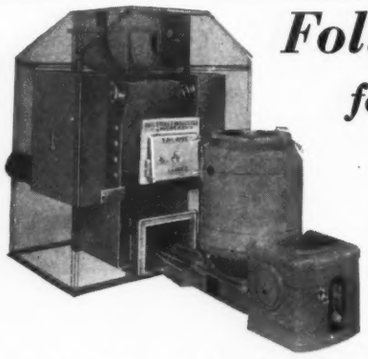
As can be seen this card has columns to be checked as to the type of prospect, what was accomplished and what must be done in follow-up. The reports from the salesmen's work cards, plus the information from the survey and the presentation, are all carefully entered by the office girl on the Prospect Card. (See illustration.) These cards are kept up to date day by day so that if a prospect 'phones into the office a complete record of what has transpired up to the night before is ready. The backs of these cards are punched out so that the card turns up in the file the day before the next call is to be made.

The insulation sales campaign has some variations. Being a new field there are more sales prospects. So the city is divided into districts for canvassing house to house, or names from gas and oil burner owners are arranged in districts and called upon. Also special literature from the manufacturer of the insulation or mimeographed sheets telling about insulation are mailed out in daily batches of 40 or 50 and in series of five pieces to these groups of names. A return card is always enclosed. Out of 100 pieces mailed possibly 10 cards are returned and one sale is made. However, the percentage of sales to mailings is climbing as the value of insulation gets mouth-to-mouth publicity. Also, in insulation, a phone canvass has been worked up and from time to time a phone solicitation is used for several days.

"Selling by telephone is not an easy job," Dan Schmidlin says. "The person calling has to have a pleasant voice, must be able to get attention within twenty-five words, must be able to follow a set sales talk and know when to make an appointment and stop talking. Very few persons make good phone canvassers and we are still trying to get one or two more."

As a result of these merchandising plans the Schmidlin company has been able to work out of many of its depression financial troubles and to make real headway with sales. For 1935 a quota was set at 100 stokers, 100 oil burning boilers or furnaces with burners, and oil burners, and 80 insulations. A daily corrected sales chart is maintained in the office so that all salesmen know how many sales and how much the others have sold to date.

All during the year occasional newspaper advertising was bought with the help of the manufacturers in the weekly building pages. Also increased mailings of manufacturers' literature are being used—all for the purpose of meeting the higher quotas.



The above illustration shows the Dailaire unit for coal with stoker installed—Note the double radiator design assuring better efficiency.

Follow the Pioneer Dailaire Trail

for a Bigger and Better Business in 1936

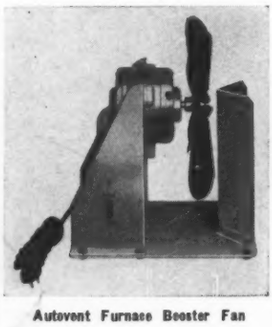
The Dailaire systems of Heating, Cooling and Air Conditioning have proven by five years of actual field operation in all climates that they are meeting every demand of their owners, and saving them 20 to 40% fuel operating cost on oil, coal or gas.

Dailaires are installed in 27 states and every climate in the country.
Air conditioning is now ready for real progress—Are you ready to follow a proven trail to a profitable business with the Dailaire line?

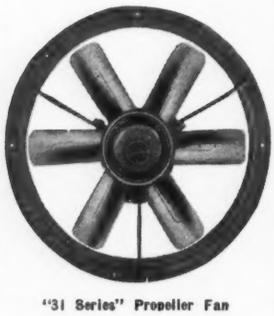
Now is your time while your territory may still be available—Write for full information and agency plan.

DAIL STEEL PRODUCTS COMPANY
1050 Main Street **Lansing, Mich.**

NEW! JUST OUT!— *Latest Performance Data and Price Sheet*



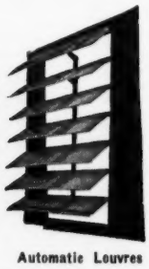
Autovent Furnace Booster Fan



"31 Series" Propeller Fan

Write today for your copy of The AUTOVENT PROPELLER FAN PRICE SHEET F-250 (Effective Dec. 2, 1935). This interesting and comprehensive bulletin gives all the newest Performance Data and Prices covering the complete line of Autovent Propeller Fans and Ventilating Products for 1936. Bring your files up to date—have the latest information on hand to meet urgent New Year demands! There is no obligation — it's FREE—WRITE TODAY!

Uniblade Volume Blower

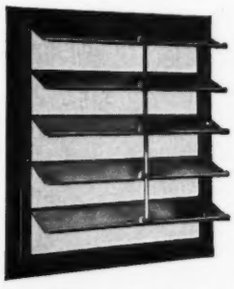


Automatic Louvres

Meet us at Booth 123, Fourth International Heating & Ventilating Exposition, New International Amphitheater, Chicago, Ill., January 27th to 29th.

Autovent Fan & Blower Company
1807 N. Kostner Ave. **Chicago, Ill.**

ELGO AUTOMATIC SHUTTERS

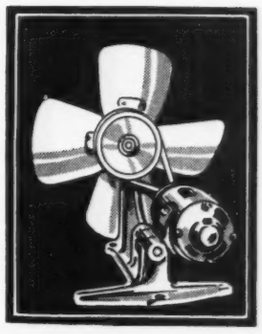


Elgo Automatic Shutters are designed to give effective protection to any exhaust fan or blower installation. Their simple construction makes them simple in operation and when properly installed they will give years of efficient and satisfactory service. Elgo Automatic Shutters are built to any size, square or rectangular. Standard sizes are carried in stock for immediate shipment. If there is any information you may desire about Automatic Shutters or back Draft Dampers, write us at once.

Your inquiry will receive immediate attention.

ELGO SHUTTER & MANUFACTURING CO.
DETROIT, MICHIGAN

THIS YEAR



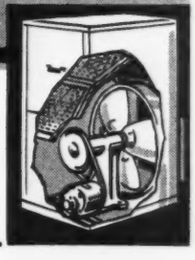
air conditioning of the home winter or summer, will really get going for the groundwork has by now been well laid. You will want your share of this business and you can get it with the

DAYTON FURNACE UNIT

Noiseless and Efficient

The Dayton Furnace Unit embodies an entirely new and proved principle of filtering and heating the air in winter—of filtering and cooling it in summer. And the price is within reach of the average home owner.

INTERNATIONAL ENGINEERING, INC
DAYTON, OHIO



LIVE DEALERS WANTED—The Dayton Furnace Unit is a distinct money-making proposition for you—a Quality Product—sound merchandising plans — substantial profits—and backed by a sound company—It's to your interest to write today for our new proposition. NOW IS THE TIME.

HESS FURNACE AIR CONDITIONER BLOWER FILTER UNIT

..FREE..

HESS WINTER SALES PLAN MAKES BUSINESS

FOR PROGRESSIVE DEALERS
Write for free copy today.

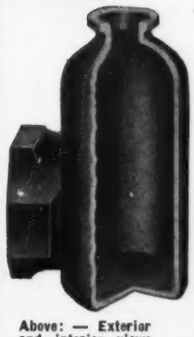
NOW--IN COLD WEATHER

You can best explain, right in your prospect's home, the great need for a Hess winter air conditioner or a blower-filter unit, and great benefit to be secured.

DEALERS: You are cordially invited to visit us at space 628 at the International Heating and Ventilating Exposition and at our factory in Chicago.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE., Founded 1873
CHICAGO, ILLINOIS

Yes! They're Easier to Sell!



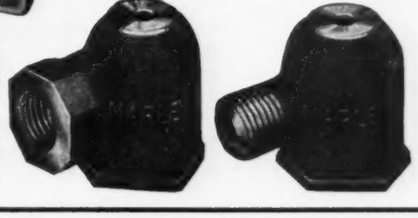
BUYERS of industrial equipment know all about Marley patented spray nozzles—by reputation if not from actual experience. For Marley nozzles have recognized advantages of design and performance that these buyers know will save them money.

Marley nozzles were new in 1925. Today they lead the field in sales. And there's a kind for every purpose.

Write for full details today.

THE MARLEY COMPANY
1915 Walnut Kansas City, Mo.

MARLEY
SPRAY NOZZLES



Above: — Exterior and interior views Marley patented spray nozzle for water cooling use.

Right: — Small Marley two-piece nozzles for air washing, brine spraying and similar purposes.

Principles of Humidification

(*Continued from page* 100)

midity above the natural humidity by a certain constant per cent.

For instance, if, in any weather, we add moisture to the indoor air at a constant rate represented by distance "e" in the chart, we shall raise the humidity from that shown by Curve N to that shown by Curve E. In Chart IV, distance "e" represents the addition of 19¼ grains of moisture for each pound of air that leaks in from outdoors. In other words, it represents the evaporation of about 6 gallons of water per day for each 10,000 cubic feet of in-leaking air per hour.

When this amount of water is evaporated into the indoor air, the relative indoor humidity will be increased by 17½ per cent points over and above the natural humidity that would otherwise exist. In 30 degree weather, the indoor humidity will therefore be raised from the natural humidity of 17½ per cent for 30 degree weather to 35 per cent, which is just to the per cent where window vapor will begin to appear, as is shown by Curve V.

Cold and Warm Weather

As weather gets colder than 30 degrees, the window vapor point will gradually descend below the theoretically maintained humidity, shown by Curve E. The slight window condensation or frost which appears will, by extracting moisture reduce the theoretically maintained humidity to Curve M which shows the actually maintained humidity. In weather warmer than 35 or 40 degrees, the furnace will not be hot enough to evaporate all the water which is fed to the evaporating pan. The indoor humidity that is maintained in the warmer weather will therefore be as shown by Curve M for 40 to 50 degree weather. This prevents excessive indoor humidity in mild weather and is automatically accomplished by proper proportioning of the evaporating surface of the pan.

In the warmer weather the indoor humidity is automatically limited by proper water pan capacity and in colder weather the evaporation is limited by the rate of water feed. This naturally prevents indoor humidity from getting too low in extreme weather, at some sacrifice of window clarity. This is as it should be.

To secure the results shown by Curve M, the owner sets the rate of water feed to a point that will give him satisfactory results in all weather. Some owners may be willing to have more window condensation in the colder weather, others will want less. In any case the owner can set the rate of feed higher or lower to meet his own ideas.

Once the right rate of water feed for any particular house has been determined only occasional re-adjustments may be desirable when occasional abnormal wind or weather conditions continue for long periods, or when an abnormal amount of moisture is added to the indoor air from such sources as cooking or washing operations.

TROUBLE SHOOTER!

There's no need to tell you how many of your troubles start with improper draft. Put a Hays draft gage in your kit bag as a trouble shooter and a trouble preventer too. It will tell you without guesswork, the exact draft pressure; defective flues or blower troubles will be shown at a glance.

For your copy of "Trouble Shooting in the Heating Plant," and "Use of the Draft Gage in Warm Air Heating Plants," write to:

THE HAYS CORPORATION
Michigan City, Indiana

HAYS

● **Blower Wheels**

Large or small . . . single or double . . . for any type fan . . . may be secured from us.

Experience says:
"Cast Aluminum Fan Wheels Are Best"

Their light weight, one-piece construction insures quiet, trouble-free service, requiring but a minimum of power for starting and operating. There are years of knowing how behind Advance fan wheels. They are well made, non-corrosive and are drilled, tapped and accurately balanced. Let us send samples that will show what you can expect on your individual specifications.

Advance Aluminum Casting Corp. ● 2742 W. 36th Place Chicago, Ill.

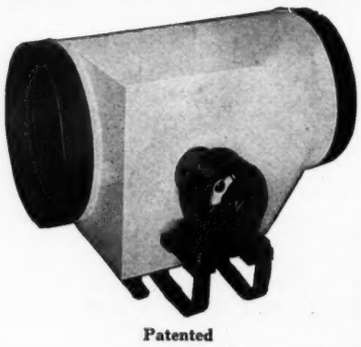
A Heat Hustler Fan Forces Air Through a Single Warm Air Pipe

Heat garages, sun porches and other rooms that will not heat by gravity. Mounts directly in the warm air pipe. Draws heat from the furnace and forces it into the hard-to-heat room. Quick heat for a bathroom.

Four reasons why you should use the American Heat Hustler:

1. It uses a positive pressure, rotary type fan.
2. Motor is outside the warm air flow, adding greatly to life of motor and leaving as much space for gravity air flow as before the Heat Hustler was installed.
3. It is quiet.
4. Furnished for either automatic or manual control.

Price list, with descriptive literature showing different models, sizes, etc., will be sent you by return mail upon receipt of your request. CLIP AND SEND THIS AD IN NOW!



Patented

AMERICAN FOUNDRY & FURNACE COMPANY
Bloomington, *World's largest manufacturers of blower furnace systems* **Illinois**

For furnace manufacturers who buy wheels only, Clarage offers any size desired, and can meet any quantity requirement. Clarage Wheels can be furnished standard width, or any percentage of standard width to deliver a specified volume of air at any operating speed. All wheels are PERFECTLY BALANCED for quiet operation without vibration.

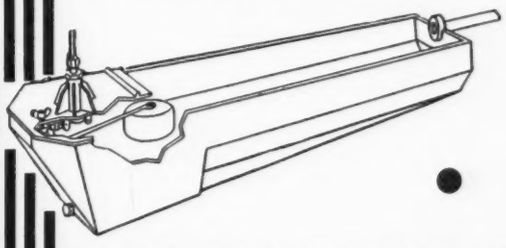
Clarage Furnace Fans (complete assemblies) combine many advantages. They are positive centrifugal type, very compact, highly efficient, and the low speeds insure SILENT OPERATION. Inlets and outlets are drilled with holes for easy attachment to ducts.

Clarage Fan Company, Kalamazoo, Michigan

CLARAGE
Air Handling and Conditioning Equipment

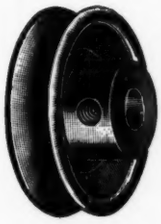
INSURE YOUR 1936 SALES!

That's what COLUMBUS humidifiers do for you. They are the final clinching factors in your 1936 sales campaigns. Make it easier to sell furnace installations by assuring the customer a complete, thoroughly modern job with a new, well designed and constructed COLUMBUS humidifier. The cost to you is too low to leave out of your estimate. The famous COLUMBUS model "C" is now offered to dealers at the exceptionally low price of $12.00 each. Order three and we'll pay the freight anywhere east of the Rockies. You can't afford to pass up an opportunity like this, mail in your order and get a head start on your competitors—and it is a humidifier you can sell with confidence.



THE COLUMBUS HUMIDIFIER CO.
154 North 5th St. Columbus, O.

MAUREY PULLEYS



Their superior design . . . their excellent materials and workmanship . . . have created for MAUREY Pulleys the reputation of positively removing pulley worries. When you use a MAUREY Pulley on an air conditioning or blower installation you can rest assured that you will have no trouble from that source. They last longer for there are no die cast hubs in MAUREY Pulleys . . . heavy, smooth rolled edges add to strength and rigidity . . . they always run true.

MAUREY . . .

Variable Pitch Diameter Steel Pulley

A steel pulley that will give a variation of as much as 30% in speed when used with any fixed diameter pulley. Specially adapted to air conditioning units.

	Outside Dia.	Pitch Diameter A Belts Min.	Pitch Diameter A Belts Max.	Pitch Diameter B Belts Min.	Pitch Diameter B Belts Max.
No. 8325	3¼"	2.1"	2.9"	2.05"	2.8"
No. 8350	3½"	2.35"	3.2"	2.3"	3.1"
No. 8400	4"	2.6"	3.6"	2.7"	3.7"
No. 8450	4½"	3.1"	4.1"	3.2"	4.2"

Bore—½" to ¾"

PULL SALES

MAUREY MFG. CORP.
WABASH at 29th CHICAGO

Model 600

A *Streamline* Blower

New! Revolutionary! See the new Lau Streamline Furnace Blower at the Heating & Ventilating Exposition in Chicago, January 27 to 31, or write now for complete information.

An exclusive design with all the mechanical perfection that has made Lau equipment a leader in the furnace blower field. And, it's amazingly low in price too! The 600 Series is available in five sizes with full size access doors on both sides . . . a complete unit with Furnacestat.

Drive and motor may be reversed on the job in less than five minutes. Both eye and price appeal in addition to many other exclusive Lau features.

LAU HEATING SERVICE, Inc.
Dayton, Ohio

Lau HEATING SERVICE inc

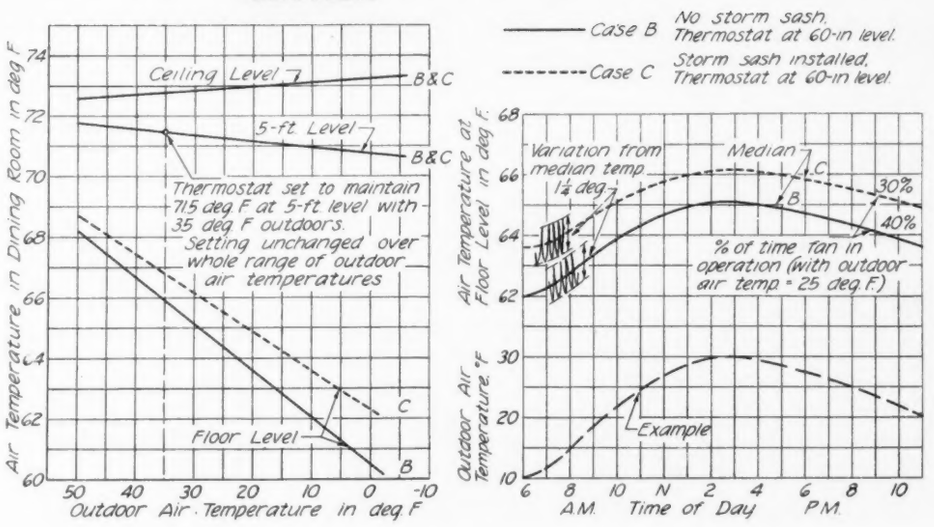


Fig. 5—Room temperature gradients obtained with and without use of storm sash windows. Room thermostat located 60 in. above floor.

as applying to any plant except the one under consideration. They do, however, serve to illustrate the comparative performance of the plant with and without storm windows. The advantages cited with the use of storm windows emphasize the importance of making adequate provision to reduce the heat-losses at what may be regarded as the most vulnerable part of the structure from the standpoint of the heating installation, namely, the doors and windows.

Conclusions

The following conclusions may be drawn from the results of these tests:

(1) A seasonal fuel saving of approximately 20 per cent may be obtained by equipping a frame building similar to the Research Residence with storm windows and storm doors.

(2) A reasonable agreement can be obtained between the fuel saving effected by storm windows and doors as computed from the calculated heat losses and the actual saving as determined by tests. The computed probable saving tends to be higher than that actually demonstrated by tests.

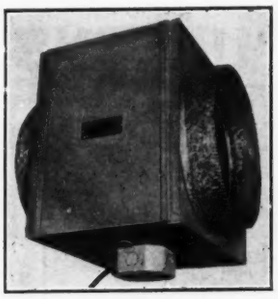
(3) For a given type of wall construction, the fuel saving effected by storm windows and doors is dependent on the ratio of the area of the windows and doors to the net area of the walls. The potential saving increases as this ratio becomes greater.

(4) Tightly fitting storm sash practically eliminate the entrance of objectionablbe amounts of soot.

(5) Storm windows make possible the maintenance of higher indoor relative humidities without condensation appearing on the glass.

(6) The use of storm windows reduces the draft of cold air down the windows and increases the temperature of the air near the floor of the room.

E. K. CAMPBELL
Furnace Fan System for schools, churches, theaters, auditoriums, industrial buildings.
THERMIDAIRE
Steam Unit Heaters, all types
Blast Coils
Blowers and Fans
Louvres and Grilles
Gas-Fired Unit Heaters
Designed and Manufactured by
E. K. CAMPBELL HEATING COMPANY
Kansas City, Mo. St. Louis, Mo.
Sales Agents in many cities



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ONE PIPE WARM AIR HEAT BOOSTERS
IN-A-PIPE FURNACE FANS
HEAVY DUTY EXHAUST FANS
ATTIC FANS CIRCULATORS
ATTENTION
JOBBERS—DEALERS
We wish to announce a new and revolutionary development in Blower Fan Units. Range of sizes from 500 to 6500 c.f.m. at most popular prices ever offered. Full details on request.
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"SILENT"
Furnace Blowers and Air Conditioning Units
For Use with
Warm Air, Steam and Hot Water Installations
Manufactured by
AIR CONDITIONING EQUIPMENT CORP.
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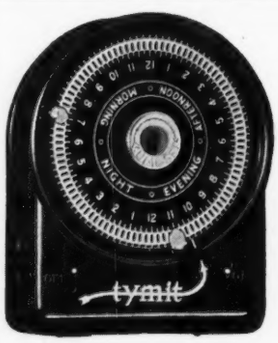

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NEW YORK CITY
Please send me quantity prices and wiring diagrams for connecting TYMIT, your new popular time control for
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The Nu Way "Genii" Oil Fired, Winter Conditioner. Fan, filters, humidifier and burner all enclosed in attractive unit.

NU WAY

Presents A NEW But PROVEN Automatic Oil Fired Winter Conditioner For The Homes Of America.

After nine years of tests, developments and engineering improvements, the Nu Way Corporation offers to the better heating dealers a perfected automatic heating unit. As a result of these years of research, through increased heat radiation, forced, filtered and humidified air, heated with a fully automatic, especially designed Nu Way "Genii" oil burner, greater efficiency is developed—thus giving an unsurpassed healthful and economical living condition to the home owner.

CONSIDER THESE SIX SALES FEATURES

1. Increased Radiation (Fuel Saving)
2. Forced Air
3. Filtered Air
4. Humidified Air
5. Attractive Appearance
6. Selling price within the reach of every home.

Write today about this most valuable Nu Way franchise available to the heating industry!

THE NU WAY CORP.

Builders of Quality Oil Burners Since 1922

ROCK ISLAND ILLINOIS

ANNOUNCING

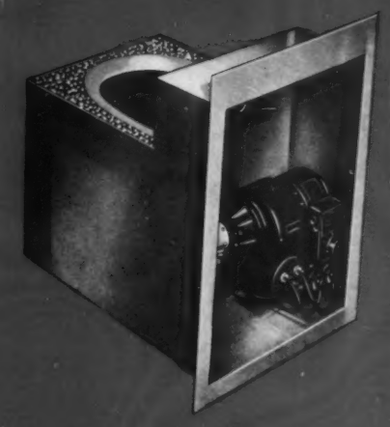
America's Finest Automatic Oil Fired Winter Conditioner

HEAT EXCHANGER

Built of the finest quality 14-gauge copper bearing steel—corrugated. Its seams are welded into one piece. Slot type lateral fire flues are used which radiate the heat which is rapidly removed by the forced air blower. No down draft. The combustion space is extra large, eliminating all hot spots. Can go through any doorway. Dimensions—23½" x63½".

FORCED AIR FAN

Electric driven—thermostat controlled squirrel cage type blower—Displaces 1800 cubic feet of air per minute.



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Oil burner is especially designed by Nu Way "Genii" engineers to be an integral part of this unit. Fully automatic; pressure type; very quiet. Installed in fire box at factory. Fire box is removable with scientific built-in combustion chamber, developing accurate high efficiency.

DRY AIR FILTERS

Filters mounted at 45 degrees, giving 1200 square inches of surface, and has a capacity of 2400 cubic feet of filtered air per minute. Practically eliminates all dirt and dust. Filters can be replaced each season at a nominal cost.

CONTROLLED HUMIDITY

Pan type placed in forced air channel—controlled with a Humidistat or Thermostat. Positive—accurate—will meet all home requirements.

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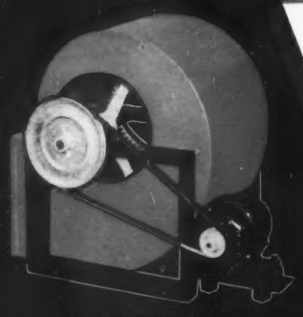
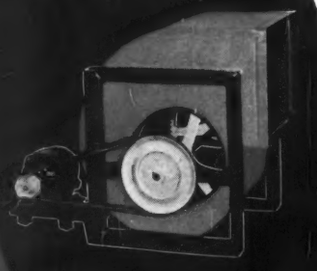
for Every Purpose

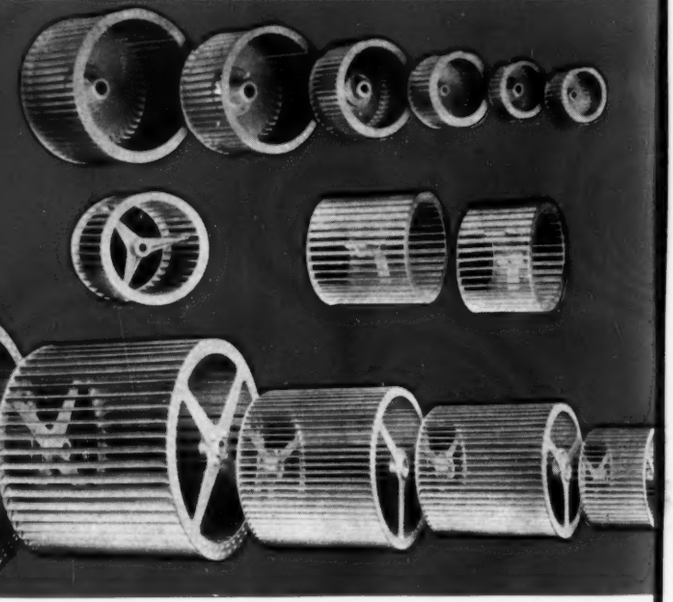
Manufactured in a complete range of sizes and capacities. Carried in stock for prompt shipment. Deliveries to suit your requirements, with or without motor drive.



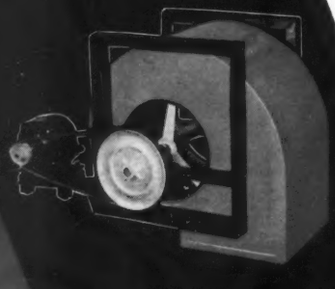
BOTTOM HORIZONTAL DISCHARGE



TOP HORIZONTAL DISCHARGE



TOP VERTICAL DISCHARGE



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For 18 years the SCHWITZER-CUMMINS HY-DUTY line has been a leader in the industrial and domestic field—wherever air handling is important. It has always led in advanced engineering—for efficient performance—for low operating costs—for low production costs.

Today HY-DUTY BLOWERS and WHEELS possess many exclusive features of great merit which it will be profitable to you to investigate for your present requirements.

HY-DUTY BLOWER WHEELS and SELF-ALIGNING, SELF-OILING, PILLOW BLOCKS also offered as separate equipment.

BLOWER DIVISION OF

SCHWITZER-CUMMINS CO.

INDIANAPOLIS—U. S. A.

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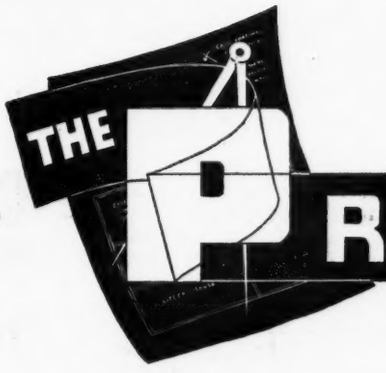

THE PROBLEM CORNER

Control

American Artisan:

I have been called in to remedy some trouble in a control system. The installation is made in connection with a direct current, farm lighting plant manufactured by the Kohler Company. I used a Minneapolis-Honeywell 8 day clock thermostat and a D-77 damper motor and a Mercoid fan switch. The thermostat controlled the furnace draft damper and the fan switch the blower.

The job was recently changed with the old D. C. system removed and an alternating current system put in its place. The motors were changed, of course. A new White damper motor was also installed. After connecting up all the wiring color to color the transformer burned out. While a new transformer has not burned out it does keep the light plant running continuously.

How can this apparatus be arranged and wired to eliminate this continuous operation of the light plant?

W. S. L., Oklahoma.

Reply by White Manufacturing Co.

The fact that one transformer was burned out indicates that the primary of the transformer draws considerable current from the 24-Volt storage battery. We know of no way that our standard equipment could be wired to avoid the trouble. The only thing we can think of would be the installation of a high voltage thermostat such, for example, as the Mercoid Type H Sensatherm to control the primary circuit of a transformer and then use a heat motor such as those made by the Detroit Lubricator Company of Detroit or the Cook Electric Company of Chicago. Such an installation would accomplish the purpose all right, but it would mean that the lighting plant would always have to run continuously whenever the heat demand of the thermostat was not satisfied.

Reply by A. S. Widdowfield, The Mercoid Corp.

The condition outlined in the second paragraph is evidently caused by exciting current drawn by the small transformer. This unit draws so much power for excitation regardless of whether or not there is a load employed on the secondary side. In the opinion of our Engineering Department, the relays on domestic lighting plants can be adjusted to compensate for continual loads of this nature, and suggest that you refer the dealer to the manufacturer of the lighting plant equipment for their advices.

Reply by L. S. Grauer, Detroit Lubricator Co.

After reading the problem I had a suspicion which was confirmed by getting in touch with the Kohler Company. On their job 32-volt storage battery current is kept on the line and as soon as any contact is made between the two sides of the line, it operates the starting mechanism and starts the plant. The primary of a transformer is always a load on the line although the stand-by current consumption is very low using not more than 1 to 3 watts. However, this would start the Kohler generating plant. As far as that goes even a telechron clock on the line would keep it running. This means that either a high voltage damper motor must be used or the high voltage circuit to the transformer broken.

To use the present thermostat and damper motor on the job would not be satisfactory as when the drafts were shut off the transformer has to be shut off and if the thermostat shuts off the transformer there would be no power to close the damper motor. It might be worked out by a complicated system of relays but I cannot see how it can readily be done.

We are attaching hereto a very crude sketch of how this problem can be taken care of. Detroit controls being all two-wire it is rather simple. The No. 855 Mercoid Thermostats breaks the circuit to the transformer. The low voltage side of the transformer is directly connected to our No. 430 Motor Unit. When the current is on the damper motor unit drafts are open and when the current is off drafts close. We know that the hook-up as shown will be correct.

Any high voltage thermostat and two-wire damper motor that does not require power to close the drafts would work equally well.

Creosote

In the November issue we published a query from a reader asking for materials or methods of eliminating a black tarry substance in a chimney and furnace. The following reply has been received from P. C. Kelly, The Kelbro Company, Burlington, Vt. Mr. Kelly says:

The black tarry substance referred to is without doubt creosote and our reason for writing you is to advise you of the fact that we now have a device on the market, the FUELMIZER, primarily designed to eliminate this deposit. The principle of our device is to allow preheated air (accomplished by the patented feature of the FUELMIZER) to circulate freely in the pipeline above the damper. As you know, this deposit is formed by the hot gases coming in contact with the cooler stovepipe above the damper. It is also efficacious in preventing chimney fires in that it does not allow the creosote to form and thus obviates the possibility of a spark from the fire igniting this highly inflammable chemical.

▲

Waterproofing

American Artisan:

Will you advise the best way to water-proof a basement after it has been built and finished.

E. H. A., Wisconsin.

Reply by the Editors

You do not state in your letter whether the basement to be waterproofed is in an old house or a new one. If it is a new house, the basement walls including foundation should be waterpoofed on the outside next to the dirt by applying a layer of waterproofing compound. Such waterproofing compounds are ordinarily made of asphalt or some tar derivative and are manufactured by the following concerns: (several firms suggested.)

If this is an existing basement and you have to do your waterproofing on the inside of the wall, you can purchase materials for inside application from the following concerns: (several names suggested.)

We cannot give you full recommendations for the use of these materials, but suggest that you ask the companies for instructions and describe as exactly as possible your particular problem. If you do not obtain the desired results, write us again.

The Problem Corner . . . . . .

Condensation

American Artisan:

Enclosed you will find a floor plan of a house giving moisture trouble. The furnace is cast iron with a vapor pan under the feed door. The tenant claims condensation exists to some extent when the vapor pan is dry and is objectionable when the pan has water in it.

N. O. A., Colorado.

Reply by the Editors

In reply to your question covering condensation on windows, we believe that the general layout of the heating system will be found to have little, if any, effect on the amount of moisture evaporated or upon the condensation on windows.

You appreciate, no doubt, the fact that condensation is a difficult problem to handle because the factors which govern condensation and the remedies which can be applied differ in all types of structures.

We do know that condensation occurs on windows not having storm sash whenever the percentage of relative humidity in-doors reaches 35% when the out-door temperature is 32°F. When the out-door temperature is 20°F., condensation appears whenever in-door humidity is 25%. When the out-door temperature is 10° above, condensation appears whenever the in-door humidity is 18%.

In other words, when we do not have tight storm sash, we must realize that we can carry very little humidity on the inside without causing condensation.

Our industry, unfortunately, has released a volume of publicity on the desirable effect of 40% to 45% relative humidity. Actually, it requires extra special house constructions consisting of double windows with all windows sealed and tight in order to carry 30% relative humidity at zero to 10 degrees above outside temperature.

Therefore, if in the house you describe your humidifying pan is at all active you can appreciate that it takes only a little humidity to cause condensation.

We are not familiar with the percentage of relative humidity in the outside air which you have in Colorado in cold weather. We were under the impression that your air was relatively dry, but possibly you have from 80 to 100 per cent relative humidity below 32°F. If this is the case, and if the windows of the house are not tight, so that infiltration occurs, it is likely that you will have to advise the owner to install tight storm sash all around in order to avoid his difficulty.

If you have a sling psychrometer or a humidity recorder we suggest that you take readings in the house and out-doors and establish what actual percentage of humidity exists. You can do very little by simply guessing at the condition. Also you do not tell us whether or not this is a new house, and if it is with moisture in the plaster you will be practically helpless until the plaster is wholly dried out.

▲

Baffling

American Artisan:

Some months ago you published an article suggesting ways of baffling furnaces. Will you tell us in what issues these articles appeared?

S. A. W., California.

Reply by the Editors

Up to the present time we have published five articles dealing with baffling practices used when converting gravity systems to forced air circulation. These articles appeared in the December, November, September, August and July issues.

We are attaching tear sheets of the articles and shall be glad to answer any questions which you may wish to ask.

REPAIR PARTS...

If you need a part for any type furnace or boiler . . . need it quickly . . . and want to make sure that you get it on time . . . ORDER FROM PEERLESS. Our stock of repair parts is most complete . . . our facilities for quick shipment most efficient. You will find it a pleasure and a saving to deal with Peerless for your repair parts . . . and you will earn your customers' thanks for the snappy service you have rendered. Be convinced . . . try Peerless on your next order.

SEND FOR THIS BIG 96-PAGE CATALOGUE NOW

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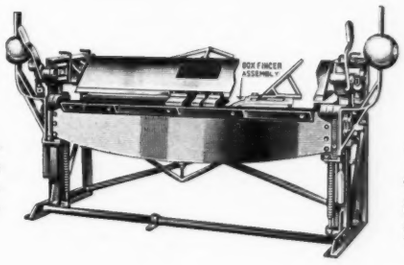
TOOLS for the WARM AIR HEATING—AIR CONDITIONING and SHEET METAL TRADES

WHITNEY -JENSEN

A combination brake for plain bending or box and pan work—convertible in 15 minutes—17 new important improvements—easy to operate—capacity up to 14 gauge.



2-IN-1 BRAKE

Whitney Line of Better Products includes Hand and Bench Punches—Slitting Shears—Angle Iron Notching, Cutting and Bending Equipment.

NEW UNIVERSAL BENDER NO. 53

Capacity ⅛" x 2"—bends cold—smallest square is 3" x 3" cube. Automatic clamp insures exceptionally neat corners. Channels bent without notching. All steel construction.

ANGLE MITRE NOTCHER AND ANGLE IRON BENDER. Capacity 2" x 2" x ¼". A pair of tools that every shop ought to have. They are Nos. 50-51 in our catalogue.

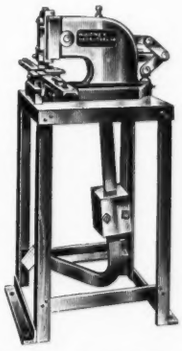
The Whitney No. 4 One-Piece Hollow Punch. Drop forged and containing a self-centering spring point. Can be furnished in sizes from ⅞" to 1⅝" by $\frac{1}{16}$" variation.

Nos. 7, 7½ and 8 Imperial Roller Bearing Lever Type Punches. Capacities ¼" through ⅛"; ¼" through $\frac{3}{16}$"; ¼" through ¼". Punch inside 90 deg. standing seams, etc.

Round Handle Solid Punches No. 00

Rivet Sets

Whitmetal Scratch Pin



No. 28 Foot Press. Capacity 2" hole in 16 gauge—100 holes per minute.

Be sure the Letter

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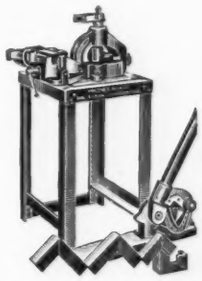
Is on All Your PUNCHES and DIES

They are made in Our Own Factory and Are Genuine

Write for Catalog and Price List on Entire Line



No. 455 Angle Iron Combination. Shears, Notches and Bends 2" x 2" x ¼" angles.

NO. 20 BALL BEARING PUNCH

Capacity ½" through ½" iron. Will also drive rivets. Made of alloy steel and heat treated throughout.

BALL BEARING PUNCHES

A complete line of all sizes with a complete range of sizes in punches and dies.

.. WHITNEY METAL TOOL CO.

91 FORBES STREET ROCKFORD, ILL.

A Leap into Space

at 80 miles per hour!

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NO, thanks, say we who value our necks. And rightly! For that is championship jumping, safe if you have "grown up" on a pair of skis, but close to suicide if you haven't.

We *expect* the champions in sports to "show us up". They *should be better,* for they have the advantage of years of training and experience. For the same reason sheet metal workers expect genuine Sheet Metal Screws to "show up" imitations. Made by Parker-Kalon, with more than 20 years of specialized experience in developing and producing them, genuine Sheet Metal Screws are bound to be superior. The experience back of them is evident in the uniformly perfect results they give, in contrast to the uncertain action of imitations that merely "look" the same.

Uniformly perfect action is required if screws are to really save time and labor in assembling sheet metal. To be sure of uniformly perfect action, specify and insist on getting "Parker-Kalon". The name guarantees assembly economy.

Genuine Sheet Metal Screws guarantee assembly economy!

They *always hold* because the threads run full diameter right to the head. They *always go in easily* because the threads are designed with expert knowledge of the work they must perform and held to a high degree of uniformity. *Their threads don't strip, nor do the heads twist off* because they are made from a special analysis wire and are hardened by an exclusive process developed from 20 years' experience in making Parker-Kalon Hardened Self-tapping Screws.

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PARKER-KALON CORPORATION
190 Varick Street New York

PARKER-KALON
HARDENED TYPE A SELF-TAPPING
Sheet Metal Screws
PATENTED NO. 1465148

PARKER-KALON PRODUCTS ARE SOLD ONLY BY RECOGNIZED DISTRIBUTORS

These Sheet Metal Working Machines are MONEY MAKERS for YOU

SQUARING SHEARS
Foot operated in cutting lengths up to 10 ft. in capacities up to 16-gauge.

Niagara machines and tools for sheet metal work are engineered for sheet metal men, by sheet metal men. They do accurate work. They are built for easy, smooth operation. The complete Niagara line provides the right machine and tool for every job.

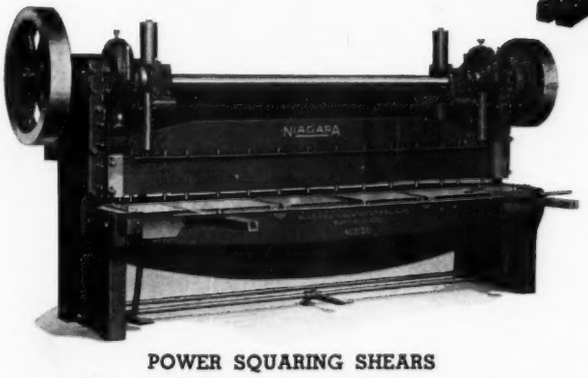
Patented

No. 172 NIAGARA ELECTRIC COMBINATION MACHINE

Patented

SLIP ROLL FORMER
Showing 2 in. diameter roll for 22-gauge. Patented features. Other sizes available.

..NIAGARA BAR FOLDER..
(Keystone Type)
An adjustable folder with new easy operating features. For folding edges on metal up to 20-gauge, depending on length.



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Write for Bulletins showing latest improvements on Niagara Power Squaring Shears.

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- ☐ Folders-Brakes
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NIAGARA

NIAGARA MACHINE AND TOOL WORKS, BUFFALO, N. Y.
NEW YORK . . . DETROIT

Minneapolis Code

(*Continued from page 46*)

stream. The result, plus a reasonable factor of safety, will be the total resistance of the system, which shall be used in the selection of the fan or blower.

Friction losses for ducts and fittings shall be determined in accordance with the best engineering practices. Resistance of furnace, filters, air washers, cooling coils and other devices shall be taken from the various manufacturer's ratings, certified as to correctness.

1203.4 Maximum Allowable Velocities: The air velocities, in feet per minute, given in the following table shall not be exceeded in the various types of installations to which they apply:

TABLE NO. 26-A

VELOCITIES THROUGH DUCTS AND REGISTERS

Description	Low Velocity System	Medium Velocity System	High Velocity System
Main ducts	500	750	1,000
Branch ducts	450	600	750
Wall stacks	350	500	600
Baseboard registers	300	350	400
Wall registers above breathing line	500	550	600

The low velocity system shall apply to residential work. The medium and high velocity systems shall apply to public building and commercial installations. For industrial or other buildings where noise is not objectionable, higher velocities may be used where conditions permit and duct work is so designed, subject to the approval of the Department of Buildings.

Velocities through air washers shall not exceed 600 f.p.m., or the maximum velocity recommended by the manufacturer in his published data.

Velocities through furnaces and cooling coils of the various types shall not exceed those recommended by the manufacturer in his published data.

Velocities through air filters of all types shall not exceed those recommended by the manufacturer in his published data.

1203.5 Dampers: In an individual duct system, each duct shall be provided with a volume damper with substantial mounting and positive locking device.

In a trunk system, each branch duct shall be provided with a splitter damper where it leaves the main trunk duct shall also be provided with a voldampers if again divided. Each branch duca shall also be provided with a volume damper. Where main duct branches into two or more trunks leaving fan, each trunk shall be provided with volume or squeeze damper to regulate air volume in each trunk. All dampers shall be provided with positive locking devices.

1203.6 Supply Air Registers: All supply registers shall be securely fastened to connecting pipe and shall be effectively sealed against leakage around the borders or margins to prevent streaking of walls. The free area of all supply registers shall be such that the air velocity through the free openings will not exceed that provided for in Sub-Section 1203.4 of this ordinance.

1203.7 Return Air Registers: Return air registers shall be made of metal or wood. The free area shall be at least equal to the free area of the duct or ducts to which they are connected.

1203.8 Construction of Ducts: In connection with any mechanical warm air heating or air conditioning system, the construction of all sheet metal duct work hereafter installed shall be in accordance with the following provisions:

TABLE NO. 27

SHEET METAL GAUGES AND SEAMS FOR RECTANGULAR DUCT CONSTRUCTION

U. S. Standard Gauge	Width of Duct in Inches	Seam in Inches	Reinforced Seam in Inches
26	to 12		
24	13 to 30	1	
22	31 to 48	1	
22	49 to 60	1½	⅛ x 1⅜
20	61 to 90	1½	⅛ x 1⅜

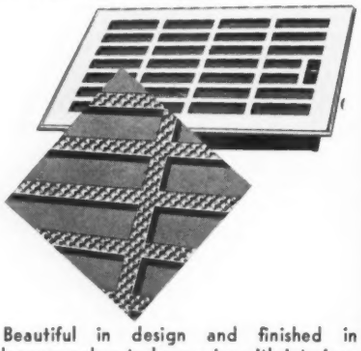
The above gauges shall apply for circular ducts of diameters corresponding to given widths.

Provided, however, that for residential work not lighter than No. 30 U. S. Standard Gauge may be used for ducts not exceeding 4½" x 14" No. 28 gauge for ducts not exceeding 12" greatest dimension, No. 26 gauge for ducts not exceeding 30" greatest di-

REGISTERS and FACES

"With An Expression Good To Look At"

PEERLESS DIAMOND GRID COLD AIR FACES

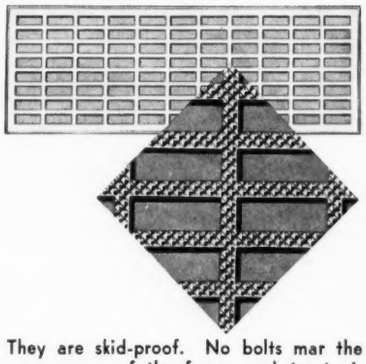


Beautiful in design and finished in lacquer colors to harmonize with interiors. Beveled edges eliminate recessing. Easy to remove for duct cleaning.

PEERLESS FURNACE FITTINGS

No matter what furnace fitting you may need, from damper clips to casing bonnets, we have them. They are all of the latest type and made of fine materials to meet the demand of the modern furnace dealer. They will fit every type of furnace and give years of satisfactory service. A complete catalogue is at your disposal.

PEERLESS DIAMOND GRID FLOOR REGISTERS



They are skid-proof. No bolts mar the appearance of the face or obstruct air flow. The louvres work easily and will not stick. Another "Customer-satisfying" Peerless Product.

WRITE FOR CATALOGUE AND NEW LOW PRICES

PEERLESS FOUNDRY COMPANY 1853 LUDLOW AVE. INDIANAPOLIS, IND.

PEERLESS HOME HEATING EQUIPMENT...

LOOK!

IT'S RYBOLT'S NEW CAST OR STEEL LINE

- BEAUTY
- EFFICIENCY
- QUALITY
- STRENGTH
- PRICE

When you combine these outstanding features, as we have done in both of these new furnaces, you have all it takes to be certain of developing increased sales for 1936. Rybolt is keeping pace with the demands of the dealers, and is placing at your disposal furnaces of improved appearance and advanced engineering principles. They are priced within the reach of all . . . to sell . . . to help you build volume as well as individual profits . . . You can sell them. . . .

The Rybolt Cast Iron

Differs considerably in design from previous models but retains the time-tested Rybolt features such as duplex ball-bearing grate and one-piece radiator. New features are the Rybolt slip-on front casting construction, eliminating joints between door frames and body of furnace. Greater heating capacity. Special analysis iron.

The Rybolt Steel

A worthy companion to the famous cast iron Rybolt, fully comparable in its class. All the advantages associated with steel warm air furnaces are found at their best in the new, scientifically designed steel Rybolt. Constructed in such a way that the heating element is practically a one-piece unit . . . good for years of heating service.

WRITE FOR FULL DETAILS

THE RYBOLT HEATER COMPANY

Eight Street, Ashland, Ohio

NORTHWESTERN

BIDS FOR YOUR REPAIR BUSINESS!

TRY Northwestern first! Practically any part for any repair job may be secured from our tremendous stock. Just think . . . over 60,000 bins that contain over 300,000 parts should be ample assurance that whatever you need can be shipped quickly and efficiently. As suppliers of repair parts to fit Furnaces, Stoves, Ranges and Boilers, Northwestern has led the field since 1869 . . . 67 years of service that we are proud of and that have placed us in the position of being the largest repair supply organization in the country.

The New Repair Parts Price List is ready to be sent you upon request.

NORCO PRODUCTS

- FURNACES
- FURNACE CEMENT
- PIPE AND FITTINGS
- REGISTERS AND GRILLES
- AIR CONDITIONING
- TANK HEATERS, STOVES, ETC.

Send for illustrated order book.

NORTHWESTERN STOVE REPAIR CO.

662 W. Roosevelt Road
Chicago, Illinois

mension, No. 24 gauge for larger sizes.

No duct smaller than five (5) inches in diameter, or corresponding area for rectangular duct of equal friction loss, shall be installed.

Ducts having a greatest dimension of more than 24 inches shall have transverse exterior braces spaced not more than 48 inches on centers. Where "S" cleats and drive cleats are used to connect ducts, formed angle cleats may be used in lieu of stiffener angles.

Elbows shall be provided with splitters or diffuser vanes where necessary to maintain uniform velocities throughout duct area and reduce turbulence and impact losses. Transformation fittings shall be made with gradual slopes. Fan discharge connections shall have a maximum slope of one (1) inch in seven (7) inches. Where a pipe or other obstruction passes through a duct a streamlined sheet metal sleeve shall be installed around such obstruction and shall be soldered to duct at ends to make air tight. The area of the duct, at point of such obstruction, shall be increased by an amount equal to the area of the streamlined sleeve.

The same general provisions, with the exception of standing seams, shall apply to circular ducts, which shall be lapped not less than one and one-half (1½) inches. Such joints shall be match-beaded, or beaded and soldered, or riveted. No soldered or riveted joint is required where round duct slips over the casing collar or enters boot or box.

All duct work shall be properly secured to ceiling or joists or supported by substantial brackets when run along walls.

Section 1204 Size of Furnace: Add together the heat losses, expressed in B.T.U., of the various rooms in the building, as determined in Part II of this ordinance and, for continuously heated buildings, add to this sum twenty-five (25) per cent of such heat losses as a factor of safety. For intermittently heated buildings, add from fifty (50) to one hundred fifty (150) per cent as such safety factor, depending upon the heat capacity of the construction material, the higher percentage applying to materials of high heat capacity such as concrete and brick. The resulting sum shall be taken as the total heat loss of the building upon which the selection of the furnace shall be based.

In the selection of a furnace to be installed in connection with any mechanical warm air heating or air conditioning plant, the following formulae shall be used in determining the size or capacity of the furnace, employing for said purpose that one of said formulae which is applicable to the kind of fuel which is to be used.

1204.1 Solid Fuel Burning Furnaces. The following formula shall be used to compute the heating capacity or output of the furnace in B.T.U. per hour.

$$G = \frac{H}{F \times C \times E}$$

where

G = grate area, square feet.

H = heating capacity or output at registers, B.T.U. per hour.

F = calorific value of fuel, B.t.u. per pound, which shall be taken as 12,790.

C = combustion rate in pounds of fuel per square feet of grate per hour which shall be taken as 7.5.

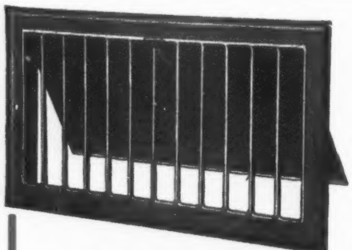
E = furnace efficiency based on heat available at register faces which shall be taken as not less than 63%.

The above formula allows 420 B.T.U. per square inch of grate area for a furnace having a ratio of heating surface area to grate area of 20 to 1. For furnaces having other ratios of heating surface area to grate area, add two (2) per cent for each unit by which such ratio exceeds 20 to 1 and deduct two (2) per cent for each unit, by which it is less than 20 to 1.

Definition: The heating surface area is hereby defined as all surfaces of the furnace body inside the casing, above the grate level, in contact with fire, flame or hot gases on one side, and circulating air on the other side, and the surface area of the air side of such portion of the furnace body shall, for the purposes of this ordinance, be considered the heating surface area of the furnace.

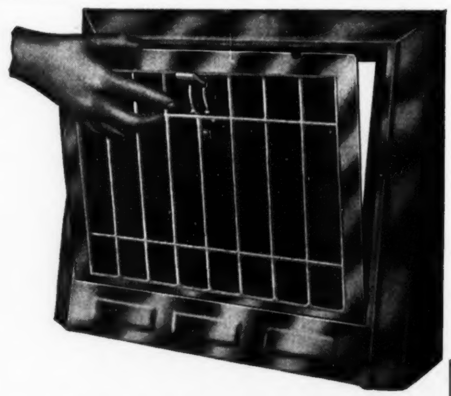
1204.2 Oil Burning Furnaces, Conversion Type: Where an oil burner is to be installed in a furnace not specifically designed for the exclusive use of oil as a fuel such furnace shall be selected as provided in Section 1204 and Sub-Section 1204.1 of this ordinance as for solid fuel burning furnaces and with the additional requirements that the heating surface to grate area ratio of such furnace shall be not

(*Continued on page* 142)



Forced-air 1-piece register and faces, wall and baseboard. Stack head sizes from 10x4 to 30x8. Directional flow registers available for 1936.

Rock Island Registers

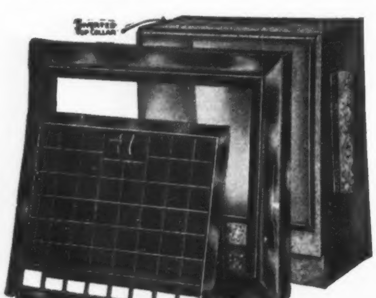


Inland City Register, 2-piece, sizes 8x10 to 12x14, pipe sizes 8 to 14 in.

There is a Rock Island Register or Air Face to meet every requirement and satisfy every taste. Beauty and utility form a happy and desirable combination in every item in the line. Rock Island Registers are easily installed, and every installation brings a worth while profit. Rock Island can help you establish a reputation for your business.

FREE ESTIMATING BOOK

Get the details. Learn more about the Rock Island Line. Write for complete information today.



Register complete with double metal head. Pipe sizes 8 to 14 in.

NO STREAK

ROCK ISLAND REGISTER CO.
Rock Island, Ill.

Net cost of individual runs of warm-air and cold-air pipe for quick estimating. Also net prices on all registers, piping and supplies. Up-to-the minute information and prices on blowers and forced-air jobs, with valuable tables. NO OBLIGATION — write today for this free book and full details about the Rock Island line.

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Rock Island, Ill.

For Fast, Accurate

SHEET METAL CUTTING - STANLEY UNISHEARS

• SPEED UP TO 15 FEET A MINUTE • CAPACITIES UP TO 1/4" BOILER PLATE •
• FOLLOW ANY LINE • CUT ANY SHAPE • FROM ANY SHEET MATERIAL •

"MIGHTY MIDGET"

Cuts up to 18 U. S. Gauge Steel. Speed: up to 15′ a minute. Easier to handle than snips — 100% safe — cannot cut the user. Interchangeable, easily sharpened blades. Net weight, 7 lbs.

No. 16

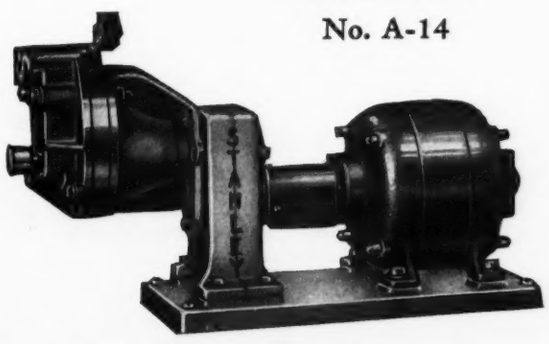
Cuts up to 16 U. S. Gauge Steel. Speed: up to 15′ a minute. Patterned after the "Mighty Midget", it is light, easy to handle. Large reserve capacity for continuous production. Net weight, 10¼ lbs.

No. 144

A larger capacity Unishear — cuts up to 14 U. S. Gauge Steel. Same cutting speed as lighter models. Weighs only 19½ lbs.

BENCH MODEL

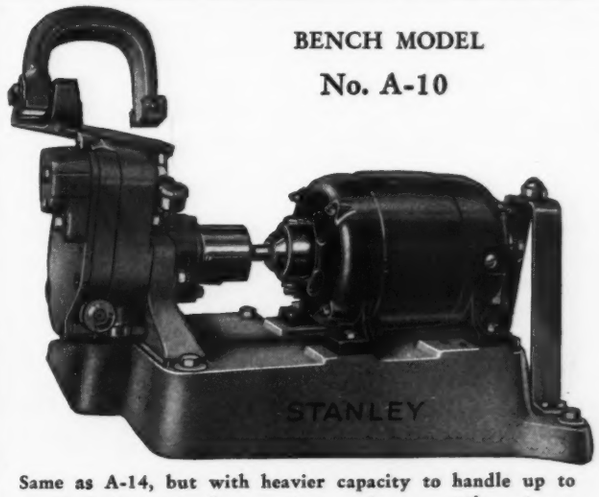
No. A-14



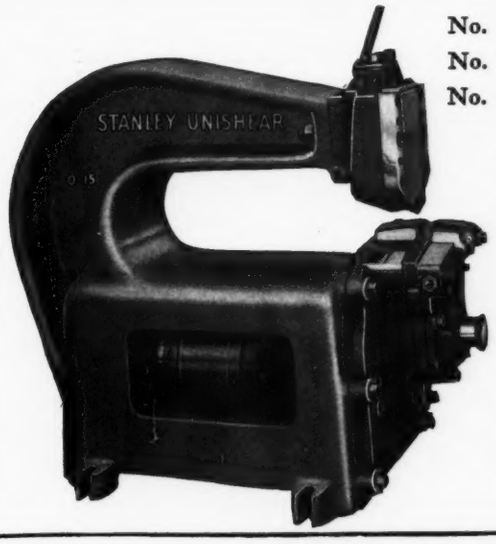
Planned for bench or pedestal mounting, this model can be carried to any job. Operates from light socket. Capacity up to 14 U. S. Gauge Steel, speed up to 15′ a minute.

BENCH MODEL

No. A-10



Same as A-14, but with heavier capacity to handle up to 10 U. S. Gauge Steel at cutting speeds up to 10′ a minute.

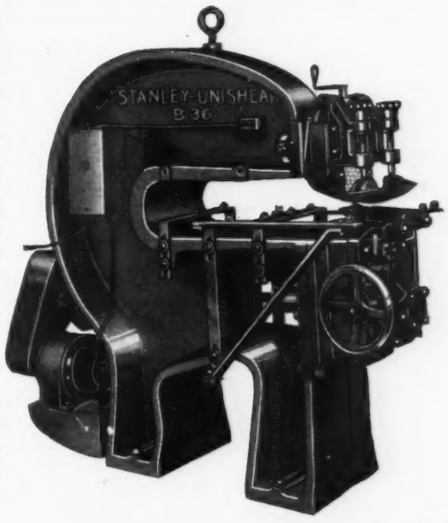


No. 0-15—15" THROAT
No. 0-36—36" THROAT
No. 0-54—54" THROAT

The "O" Model Unishears can begin a cut in the center of the sheet without a starting hole. Cut up to 14 U. S. Gauge. Also can make circular cuts with radius as small as ¼". Handles sheets up to 96" x 48".

No. B-36

Same operating principles as "O" models, but with tremendous capacity—up to ¼" boiler plate at speeds up to 10′ a minute.



DESCRIPTIVE CIRCULAR ON REQUEST

STANLEY UNISHEARS

STANLEY ELECTRIC TOOL DIV.
THE STANLEY WORKS
New Britain, Conn.

A complete line for Industry **STANLEY ELECTRIC TOOLS** *"Cost Less Per Year"*

Hayden Planetarium

(Continued from page 39)

Working downward, each sheet was placed individually in position for welding by means of block and tackle, and welding was aided by a special jig based on the floor some 47 feet below. As joints were completed, suspension straps were attached behind, bolted secure and adjusted by the turn buckle.

Forming

Contour was secured in the shop for all sheets with an electric drop hammer, work resting on a die. From time to time as hammering progressed sheets were removed from the hammer and tested for accuracy over another accurate die, high and low spots then being removed. This operation was done by E. G. Budd Mfg. Co., Philadelphia, Pa. Following installation, a coat of flat white paint was applied to the entire projection dome to enhance the clearness of the heavenly scene flashed onto it by the telescopic projector resting on the floor.

The space between the projection dome, although 10 feet at the crown, is only 1 foot 6 inches at the bottom, that is, 9 feet from the floor. Although not a perfect surface, strictly speaking, the dome surface offers no impediment to faithful reproduction of the sky scene, sheet laps not being apparent from the floor.

As one views the Hayden Planetarium externally he sees at present an attractive hemisphere about 80 feet in diameter by one-half this dimension in height and colored dark russet. Soon the patina to form will present a uniform green that harmonizes well with the verdancy of the little park surrounding the planetarium.

Exterior Copper

Jacob Ringle & Son, Jersey City, N. J., sheet metal contractor, who laid the 13,500 pounds all-sheet-copper exterior jacket, 18 ounce thickness, unlike the artisans who finished the interior dome, began operations at the roof line. Flashing of the red metal was carried 1 foot outward around the entire periphery. Slag-type roofing then covered the flashing and was carried snugly up to and surrounding the bottom course of soft copper sheets used for the dome covering.

Before the red metal was applied, however, a single layer of roofing felt was nailed to a 1½-inch soft cement coating on the reinforced concrete dome. The concrete was 12 inches thick at the base, thus offering a special setting ring for the support of the entire dome.

Copper roofing then was carried towards the crown, two layers at a time, circumferentially, rather than in single courses. Sheets were joined with outside flat seams throughout. Each seam, locked ½ inch, had a folded-in 2-inch copper cleat, so cleats were nailed through the felt and into the cement. Cleats were then folded back on themselves to cover nail heads. Two 1½-inch copper nails were applied per cleat, the latter being on 8-inch centers.

Extra weather protection was accorded the top sheet course and crown by soldering joints. The top one-third of the entire dome received special treatment by filling

VERNALLOY!

THE PROVEN SALES STIMULATOR!

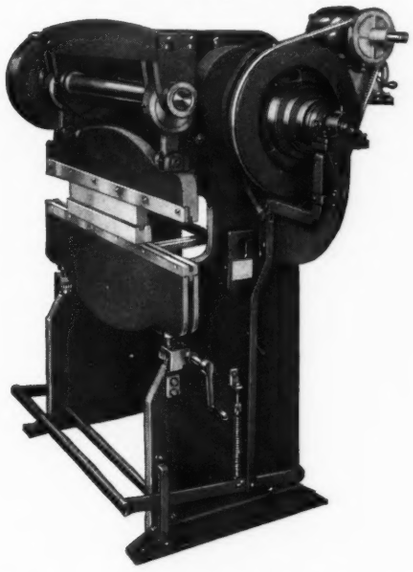
Vernalloy is the "convincing metal" . . . it proves to prospects that it is superior . . . that it will last 1½ times as long as ordinary cast iron . . . that furnaces made of it will last and operate efficiently for many years.

It has gone through the startling "Hell on earth" test and emerged victorious. We build this great metal into a furnace that is engineered perfectly . . . that operates easily, faultlessly and with a minimum of care . . . and we give you Vernois, the Mt. Vernon furnace that sells on merit . . . that makes customers think . . . and buy.

It will develop sales and increased profits in your territory. Write for complete details.

Mt. Vernon Furnace & Manufacturing Co.
Mt. Vernon **Illinois**

This is No. 253
CHICAGO STEEL PRESS
Will Do 40% to 60% of the Forming Work Turned Out by the Average Shop



This compact, ruggedly built, 48", No. 14 gauge capacity, Chicago Steel Press brake is an economical and profitable production unit. It is ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes and a great variety of sheet metal specialties. Variable speed drive operates from 17 to 50 strokes per minute. Precision built of highest quality materials by master craftsmen.

Write for Circular 253

CHICAGO STEEL BRAKE

MADE IN 35 STANDARD SIZES FOR STRAIGHT BENDING AND BOX AND PAN WORK. SPECIAL BRAKES BUILT FOR DIFFICULT JOBS. BEST BY TEST OF OVER 35 YEARS.

See Our Exhibit at the 4th Annual International Heating & Ventilating Exposition

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. · CHICAGO, ILL.

BRAUER CAN SERVE YOU BETTER!

ORDER FOR FURNACE POTS GRATES FEED SECTIONS FIRE BRICK ETC ...

ORDER FOR STOVE AND RANGE PARTS

WATER FRONTS

ORDER FOR OIL STOVE REPAIR PARTS AND WICKS

ALL ON ONE ORDER TO BRAUER'S •

•ALL IN ONE SHIPMENT TO YOU

REPAIR PARTS

ONE ORDER
SHIPMENT
FREIGHT BILL
CHECK

WE ALSO STOCK

Air Filters
Asbestos
Blowers
Booster Fans
Check Drafts
Controls
DUSTOP Air Filters
Dampers
Damper Clips
Fans
Filters
Fire Brick
Fire Clay
Grilles
Furnace Cement
Mica
Registers
Roof Cement
Stove Bolts
Stove Rods
Vacuum Furnace Cleaners
Water Coils

A. G. BRAUER SUPPLY CO.
ST. LOUIS, MO.

seams with white lead paste before locking. Sheets for the lower two-thirds of the dome were simply flat locked, cleats nailed down. So expert was the work, however, that virtually a smooth surface is presented. Gathering patina will in time provide the appearance of a totally smooth surface.

Course Lines

No unsolvable obstacles marred the sheet metal contractor's work. Perhaps a major problem, however, was maintenance of a true course line in sheet laying. To achieve this it was necessary to mark off each course on the dome at various points through perforations of a special sheet metal strip suspended from a ring bolt attached to the dome cap. The strip ran to the dome base line. Accuracy within 1/8 inch thus was made possible.

As individual sheets were fabricated in the shop practically the same problem as to shape, size and contour obtained as occurred in connection with sheets used in the projection dome. Patterns had to be made for every course by standard methods found in text books with which readers are familiar. Sheets were machine edged ready for lock seaming; concave contours were hammered true and all of the more than 4,000 individual sheets sent to the planetarium in approximately marked bundles.

Fabrication

As individual top sheet widths varied according to courses as the latter approached the crown, widths became narrower and contours more pronounced. True shapes were acquired by the sheet metal contractor in this instance by using angles curved to true diameter of individual courses and sheets individually shaped in conformity.

Shearing was effected with the aid of a template, or master, developed for every course of sheets. Following laying, the dome received a lye wash and was sprayed with a dilute acid solution to hasten weathering and bring uniformity of coloring.

The cost of the Hayden Planetarium exceeded $650,000, but is being amortized by admission charges. It is believed to be the fourth such type of building in the United States. Trowbridge & Livingston, New York City, were the architects and White Construction Co. of New York were general contractors.

Minneapolis Code

(*Continued from page* 138)

less than 20 to 1. Where such ratio is less than 20 to 1 the next larger size furnace shall be used.

1204.3 Oil Burning Furnaces, Unit Type: Where a furnace is specifically designed for the use of oil fuel only and has an oil burner designed for adaptation to that particular type of furnace installed as an integral part of said furnace, the whole being sold as a single unit, then the capacity or output in B.T.U. per hour available at the registers shall be determined by the following formula:

$$R = F \times C \times E$$

where

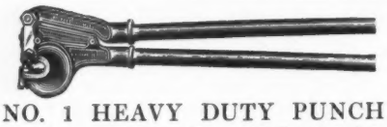
R = capacity or output in B.T.U. per hour at registers.
F = calorific value of fuel, B.T.U. per gallon.
C = combustion rate, gallons per hour.
E = overall efficiency, not to exceed 67%.

Provided, however, that in any such oil burning furnace so installed, the ratio of heating surface (expressed in square feet) to oil input (expressed in gallons per hour) shall be not less than 40 to 1.

W. A. WHITNEY MFG. COMPANY

636 RACE STREET — **ROCKFORD, ILLINOIS**

Look for this mark when buying



NO. 1 HEAVY DUTY PUNCH

Length 34", weight 22 lbs., well distributed to nicely balance the tool. Capacity 3/8" hole through 1/4" iron. Heavily reinforced for strains. Punches and dies 1/8" to 9/16" by 1/64". Insertable Pipe Handles.

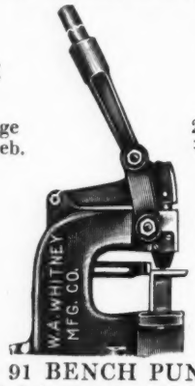
CHANNEL IRON PUNCH

Every part of this Punch is interchangeable with the No. 2. Length 23", weight 16 1/2 lbs. Depth of throat 1 7/8". Capacity 1/4" through 1/4" iron. Punches and dies 3/32" to 1/2" by 1/64".

NO. 6 FLANGE PUNCH

Punches within 3/8" of inside corner of Angle Iron. Capacity 1/4" through 5/16" iron. Depth of throat 1 3/4", throat opening width 1/2" above die top. Punches and dies 1/8" to 3/32" by 1/32". Especially adapted for Button Punching. Weight—10 lbs.

Channel Iron 2 1/2" Flange x 1/4" Web.



Angle Iron 2 1/2" x 2 1/2" x 1/4".

NO. 91 BENCH PUNCH

Capacity 5/8" hole through 1/4" iron, 1" hole through 1/16" iron, 2" hole through 1/8" iron. Weight 82 lbs. Depth of throat 5". Stock size of punches and dies 1/8" to 2".

EXTRA PUNCHES *and* DIES

Prompt shipments can be made of any size or any quantity of both types of extra punches and dies as here shown.

NO. 2 PUNCH

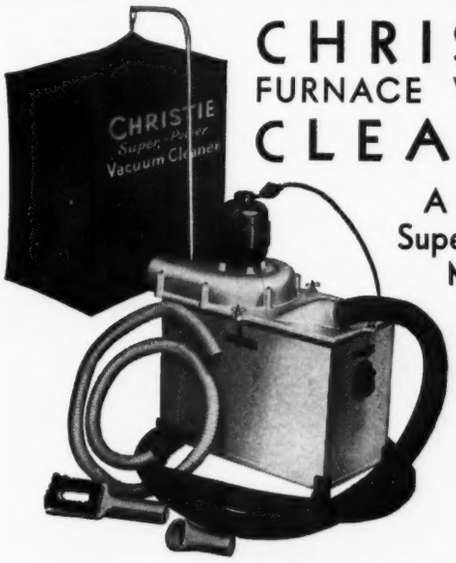
Length 23". Capacity 1/16" through 1/4" iron, weight 13 lbs., depth of throat 1 1/16". Punches and dies 3/32" to 1/2" by 1/64".

NO. 4-B ONE HAND PUNCH

Length 8 1/2". Capacity 1/4" through 16 gauge iron. Weight 3 lbs. Depth of throat 2". Punches and dies 1/16" to 3/32" by 1/64".

NO. 8 PUNCH AND VISE

Capacity 1/4" hole through 1/8" iron. Length 18 1/2", weight 7 1/2 lbs. Depth of throat 2". Stock size of punches 1/16" to 7/16" by 1/64". Punch Vise as shown above—holding our No. 8 punch. Weight 5 lbs. Made of Malleable Iron. Bolts to bench or plank. Capable of holding any of our punches.



CHRISTIE FURNACE VACUUM CLEANER

A One-Man Super-Powered Machine

$99.50

(Subject to Change Without Notice)

F. O. B. Cincinnati with Tools and Attachments

This is the same high quality machine that is known to furnace dealers everywhere as the most powerful, one-man cleaner on the market. Built by practical furnace men.

Quantity production and large purchasing power enable us to make this sensationally low price. Includes tools and attachments. Folder "A" mailed upon request.

We also manufacture the "Christie Giant" to operate from truck or yard.

Sold by Jobbers and Furnace Manufacturers.

DISTRIBUTORS WANTED: Write for interesting proposition.

CHRISTIE CLEANER COMPANY

Division of The Cincinnati Sheet Metal & Roofing Co.

226-30 East Front St. Cincinnati, Ohio

ELIMINATE COMPLAINTS *with* Nu DRY

When you install or repair a furnace the surest way to prevent service calls and complaints is to cement the joints with Nu DRY. It comes to you in dry form . . . takes less material to set a furnace . . . DOES NOT CRACK OR POWDER WHEN FURNACE IS FIRED IMMEDIATELY AFTER APPLIED . . . will not shrink . . . keeps joints tight at all times . . . will withstand high temperatures . . . and eliminates material losses for it does not harden in containers.

Write today for prices and nearest jobbers' names.

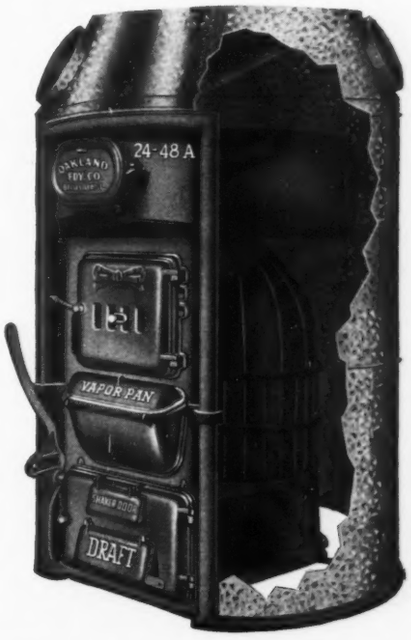
PYROLITE PRODUCTS CO.

Refractory Engineers

1221-31 West 74th St. Cleveland, Ohio

"STURDY OAKLAND"

The furnace that possesses every qualification to do a perfect heating job.



- STURDY CONSTRUCTION . . . . to insure long wear
- ENGINEERED BY HEATING EXPERTS . . .
- LARGE GRATE AREAS
- LARGE HEATING CAPACITIES
- DUPLEX ROLLER BEARING LEVER HANDLE GRATES . . . .
- PRICED LOW ENOUGH TO MEET EVERY TYPE OF POCKETBOOK

Write for complete information on the Sturdy Oakland . . . . and you will then understand why it has enjoyed such outstanding success in the past years.

CATALOGUE AND PRICES UPON REQUEST

OAKLAND FOUNDRY CO.

BELLEVILLE, ILLINOIS

Bright Metals

(*Continued from page 42*)

tion to present or future problems.

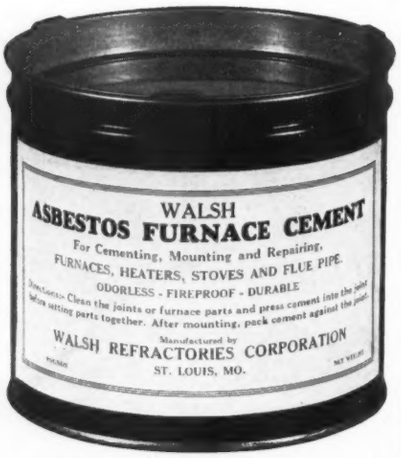
Indicating the wide variety of uses to which bright metals are now being part is the survey shown on page 43. The information was gathered by means of a questionnaire sent to contractors in large and small towns, to contractors using much bright metal and to others using the material occasionally. Of interest is the information in columns 7 and 8 showing the products made of bright metal by the reporting contractor. Contractors who have not used these new materials may be surprised at the number of different products now in production. The products listed show many uses in process industries, numerous institutional adaptations where cleanliness is the predominating problem, plus dozens of special uses which the contractors have developed or which have been brought to them for experiment.

As shown by the tabulation industrial uses account for the greatest variety of products. On the other hand residential uses, while not so varied, indicate that practically every sheet metal contractor in touch with home modernization has sold bright metal for kitchens. The industrial uses range from standard production items such as the equipment now popular with restaurateurs to the highly specialized items made to order to meet specific requirements. Industry, particularly the food industry, has used bright metal extensively, as has the tavern business.

Characteristics of Popular Bright Metals

Manufacturers' Name	Material Grade Name	Chromium %	Nickel %	Other Elements %	Magnetic Reaction	Cold Working Properties[5]	Welding Limitations	Welding Rod Recommended	Corrosion Resistance
Allegheny Steel Co. Brackenridge, Penna.	Allegheny Metal (A, B, C, MO, Ti, 2520, 22, 44)	17-20	7-12	Mn.-.50-1.2 P.-0.25 max. Si.- .5 max.	None	Good	None	Same material	Unaffected by most substances
Allegheny Steel Co., Brackenridge, Penna.	Allegheny 33	12-14	.....	Mn.- .5 max. Si.- .5 max. C.-.12	...	Good	None	Same material	Excellent
Allegheny Steel Co., Brackenridge, Penna.	Allegheny 66	16-18	....	Mn.- .5 max. Si.- .5 C.-.12 max.	...	Good	None	Same material	Excellent
U. S. Steel Corp., New York	U. S. S. 18-8	17-20	8-12	Mn.-.5 max. Si.-.75 max. C.-.15 max.	...	Good	Good for all types	Same material	Unaffected by most substances

WALSH PRODUCTS



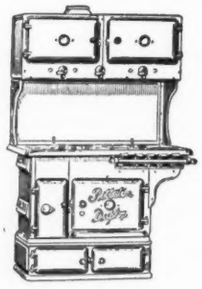
WALSH ASBESTOS FURNACE CEMENT
Assures satisfactory furnace installations and repairs. Packed in 1, 2, 3, 5, 8 and 10 pound cans . . . also 25, 50, 100, 250, and 500 pound steel drums.

WALSH HEARTH MIX
A superior monolithic refractory for moderate heat duty. For poured linings, special shapes, oil burner hearths, etc. Packed in 50 and 100 pound heavy bags.

WARCO FURNACE LININGS
Highly refractory . . . uniform in size and shape . . . possessing excellent resistance to abrasion and extremely smooth surface.

WALSH PLASTIC FURNACE LINING
A high heat resisting fire brick in plastic form, ready for use, with outstanding working, drying and burning properties. Used extensively for repairing broken, cracked and burned-out fire pots. Packed in 5 and 10 lb. cans; 25, 50, 100, 150 and 500 lb. drums.

Walsh Refractories Corporation
4430 North First Street St. Louis, Mo.



We Manufacture a Full Line of Coal Ranges, Bungalow Ranges, Combination Coal-Gas Ranges, Coal Heating Stoves, Warm Air Furnaces.

Write for prices

PITTSTON STOVE CO.
P. O. Box 29 Pittston, Pa.

NEW PROCESS
ROLLED STEEL-ANGLE

FLANGES

Angle Flange Leg Rolled In

Steel Angle Flanges

A revolutionary improvement over any flange you have ever used. They are accurate in every dimension, uniform in curvature, free from distortion, and have a perfectly smooth surface that assures a tight joint.

LARGE STOCK FOR QUICK DELIVERY
IN STANDARD SIZES FROM 6" to 36"

Larger sizes rolled when desired. Also special angles, tees, channels, bars and rods rolled in any direction to any radius or part of a circle.
Write for descriptive literature—list of stock sizes and discount sheet.

GALVANIZED LOCK-SEAM PIPE

10 ft. lengths furnished in sizes from 3" up—26 gauge to 16 gauge inclusive.

CHICAGO METAL MFG. CO.
3720 S. Rockwell St. Chicago, Ill.

BRILLION
WARM AIR FURNACES

GIVE STEADY RELIABLE SERVICE !

Year in and year out Brillion Furnaces will perform efficiently, economically and with a minimum of attention. They are built to last, to assure your customer of complete satisfaction . . . they are engineered to heat properly . . . they are constructed of only fine materials to assure faultless operation . . . they are priced right.

Brillion Furnaces will sell . . . and you can sell them. Each sale will insure a nice profit for you. Line up with Brillion for 1936.

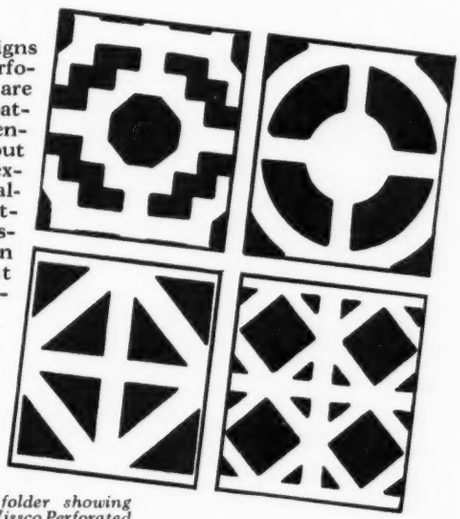
No. 100 Series

The 100 Series is a pipe furnace of two-piece radiator construction of the horseshoe type or two way travel. Radiator is convertible so that smoke pipe can be taken out at any convenient point. Casings can be furnished lined or unlined as an extra. Write for complete construction details.

BRILLION FURNACE COMPANY
Brillion, Wisconsin

GREATER CONCEALMENT
with more air space!

The new designs in Wissco Perforated Metals are beautiful in pattern, and scientifically laid out so as to offer excellent concealment, permitting free passage of air in the greatest possible volume.



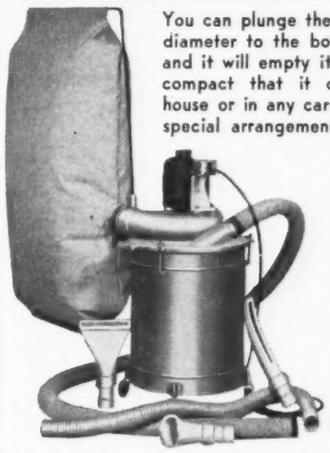
Send for this folder showing new designs in Wissco Perforated Metals. It is of value to you.

WICKWIRE SPENCER STEEL COMPANY
41 East 42nd St., New York City
Worcester Buffalo Chicago San Francisco

WICKWIRE SPENCER perforated metals

DON'T BE MISLED

THE GRAND RAPIDS FURNACE CLEANER WILL BE MORE PROFITABLE FOR YOU THAN ANY LARGER OR SMALLER UNIT. IT IS UNEQUALED IN WORKING POWER.



You can plunge the hose which has a 2" inside diameter to the bottom of a big can of ashes and it will empty it. It is sturdily built and so compact that it can be carried about the house or in any car with men and tools without special arrangements.

"A Plan To Increase Your Sales" goes with the machine which is not an arm chair theory but the outcome of successful experience.

CONVENIENT TERMS — UNBELIEVABLY LOW PRICE — OUR FREE TRIAL WITHOUT COST OR OBLIGATION TO YOU WILL PROVE OUR STATEMENTS.

Write for details.

GRAND RAPIDS FURNACE CLEANER COMPANY
Grand Rapids, Michigan

Manufacturers' Name	Material Grade Name	Chromium %	Nickel %	Other Elements %	Magnetic Reaction	Cold Working Properties[3]	Welding Limitations	Welding Rod Recommended	Corrosion Resistance
U. S. Steel Corp., New York	U. S. S. 17	16-18	.....	Mn.-.5 max. Si.- .5 max. C.- .1 max.	Yes	Not as ductile as 18-8	Good for all types	Same material as for 18-8	Unaffected by most substances
U. S. Steel Corp., New York	U. S. S. 12	12-14	.....	Mn.-.5 max. Si.- .5 max. C.- .1 max.	Yes	Can be hardened	Good for all types	Same material	Caution
The American Rolling Mill Co., Middletown, Ohio	Armco 18-8	17-20	8-10	0.08 max.	No	Extremely ductile	Satisfactory for gas, arc, resistance	Use low carbon with nickel like parent metal	Resistant to practically all exposures
The American Rolling Mill Co., Middletown, Ohio	Armco 17	15-18	.....	0.12 max.	Yes	Good ductility	Satisfactory for gas, arc, resistance	Use low carbon with 20% chrome	Resistant to weather, chemicals, nitric acid
Ludlum Steel Co., Watervliet, N. Y.	Silcrome 12	12-14	C. .12 max.	Si.-.50 max. Mn.-.50 max.	...	.....	.....	Same material	.....
Ludlum Steel Co., Watervliet, N. Y.	Silcrome 17	16-18	C. .12 max.	Mn.-.50 max. Si.-.50-1.00	...	.....	.....	Same material	.....
Ludlum Steel Co., Watervliet, N. Y.	Silcrome RA	16-18	C. .12 max.	Mn.-.50 max. Si. Abt. 1.00 Cu. Abt. 1.00 C.-.20 max.	...	.....	.....	Same material	.....
Ludlum Steel Co., Watervliet, N. Y.	Silcrome KA2	17-19	Ni. 7-9	Mn.-.60 max. Si.-.75 max. C.-.08 max.	...	.....	.....	Same material	.....
Ludlum Steel Co., Watervliet, N. Y.	Silcrome KA2S	17-19	Ni. 7-9	Mn.-.60 max. Si.-.75 max.	...	.....	.....	Same material	.....
Republic Steel Corporation, Alloy Steel Division, Massillon, Ohio	Enduro S	14-16	.....	.....	Yes	Good	Brittle[3]	16-18% cr.	Fair (not mineral acids)
Republic Steel Corporation, Alloy Steel Division, Massillon, Ohio	Enduro AA	16-18	.....	.....	Yes	Good	Brittle[3]	16-18% cr.	Good (not mineral acids)
Republic Steel Corporation, Alloy Steel Division, Massillon, Ohio	Enduro 18-8	17-19	7- 9	Carbon over .08-2	No	Good	Very good[4]	18-8S	Good (not mineral acids)

"ANY Furnace Firepot Repaired for $15"

—and a profit of $10 for the furnace man

WITH FIRELINE you can repair any domestic furnace firepot in about 1 hour . . . can sell the complete job for $15.00 and still make $10 on your labor. Think what this means. Even the competitor with a local source for cheap "boot-leg" castings can't compete in *price*, in *service*, nor in *profit* on labor.

Lasts indefinitely—is guaranteed not to crack, fuse or spall. Has strength to withstand ordinary erosion and poking.

FIRELINE is a new refractory material, comes like putty and is easily and quickly molded to any thickness. It "burns in" with an ordinary fire, is set in an hour . . . and is guaranteed to withstand 3,000°F., not to crack, fuse or spall, and to protect firepot walls indefinitely. It raises combustion temperature, increases the capacity of the plant and ends smoke, soot and fuel waste.

Costing from ⅓ to ⅛ as much as new castings and fitting all makes and models it multiplies your immediate market proportionately. If you question the volume of business waiting for FIRELINE, advertise: "Any Furnace Firepot Repaired for $15" and watch this high-profit work roll in.

Repairs cracked and broken firepots — 90 per cent of the times without taking down furnace.

Write for full information, Installation Instructions and FREE SAMPLE.

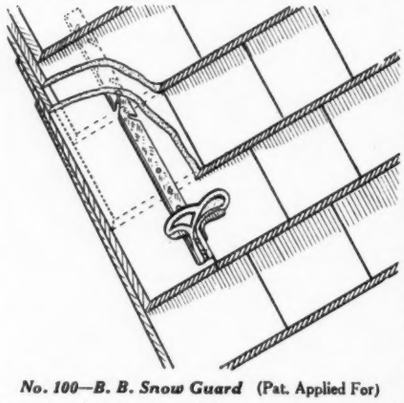
Fireline Stove & Furnace Lining Co.
1866-A Kingsbury St., Chicago, U. S. A.

FIRELINE

(Copy., 1935. Plibrico Jointless Firebrick Co.)

SOMETHING NEW!

SNOW GUARD FOR OLD ROOFS



No. 100—B. B. Snow Guard (Pat. Applied For)

This guard was principally designed for use on old roofs, but is equally as effective on new work.

On new work, it is applied the same as other guards with plates. On roofs where the slate or shingles are already on, the operation is very simple—simply slide the slotted plate up under the slate or shingle; engage a nail, holding the slate or shingle in one of the convenient slots, pull the guard down slightly to take the benefit of the full length of the slot—nothing else to do.

ENDORSED BY PROMINENT SLATERS

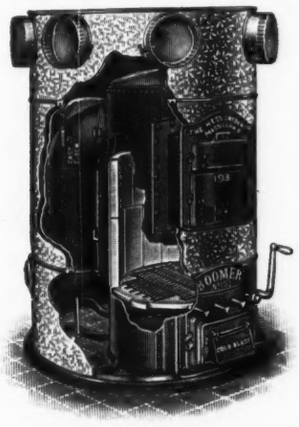
Made of heavy stamped steel, hot galvanized after forming and solid copper. Unusual strength—ease of application—ornamental. Does not require removing of slate or shingles—no danger of breaking the slate or shingles in applying. Snow guards protect gutters, shrubbery and human life.

Order from your jobber

BERGER BROS. CO.

229-237 ARCH ST. PHILADELPHIA, PA.

16TH AND GROVE STS., JERSEY CITY, N. J.



Boomer Boiler Plate Furnaces

Also made with duplex grates and upright shaker.

Have been successfully made for 23 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 23 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

Nothing but the best of material enters into the making of Boomers.

When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

We sell to legitimate dealers only.

THE HESS-SNYDER CO., MFRS.
Massillon, Ohio

HEATING—

REPAIRS

Everything, anything, and made of the finest materials—are all CENTRAL REPAIR PARTS.

TO FIT ALL MAKES OF . .

- STOVES
- FURNACES
- BOILERS
- OIL STOVES

CENTRAL FURNACE & STOVE REPAIR COMPANY

3937 Olive Street. St. Louis, Missouri

"370 SPECIAL"

RED OXIDE ROOF PAINT

The Standard of Quality

Sold only through recognized Sheet Metal Jobbers

Lyon, Conklin & Co., Inc., Baltimore & Washington
Stichter Hardware Co., Reading, Penna.
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Herr & Co., Lancaster, Penna.
Follansbee Brothers Co., Pittsburgh, Pa., Rochester, N. Y.
Eagle Roofing and Art Metal Works, Tampa, Fla.
The Moise Steel Co. of Ohio, Cincinnati, O.
Vorys Brothers, Inc., Columbus, O.
McClure-Johnston Co., Pittsburgh, Pa.
Demmler Bros. Co., Pittsburgh, Penna.

Manufactured by

THOMPSON & COMPANY
Since 1847

P. O. BOX 6757 PITTSBURGH, PA.

VICTOR FORCE AIR FANS

Powerful—Rugged—Dependable
Better Performance — Lower Cost

Here's a line of exhaust fans that give you greater value for your money than you can find anywhere else. They are built right and priced right—and they are guaranteed to give perfect satisfaction. Equipped with Victor's own super-powered motors, they will out-perform any ordinary fan. Sizes range from 6" to 16". Be sure to write for literature and prices today!

The Victor Heat Booster Brings the Heat Up Fast—Improves Heating Efficiency Greatly

Now, you can make any hot air system perform better. Pulls "cold air cork" out of pipes in a hurry—increases heat circulation—cuts fuel bills. Solves early morning heating problem—greater comfort for every furnace owner.

Only **$5.95** List

Easy to Install

Floor type booster fits neatly under register—connects to nearest electric socket. No trouble—just a few minutes to install. Wall type booster mounted on beautiful maroon finished panel which hangs on grille. A great profit item for any furnace repairman—write for complete details now!

VICTOR ELECTRIC PRODUCTS, INC.
748 Reading Road Cincinnati, Ohio

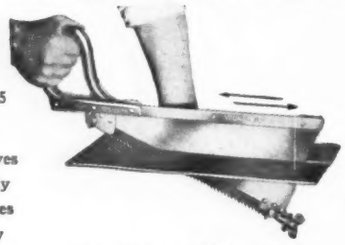
Manufacturers' Name	Material Grade Name	Chromium %	Nickel %	Other Elements %	Magnetic Reaction	Cold Working Properties[5]	Welding Limitations	Welding Rod Recommended	Corrosion Resistance
Republic Steel Corporation, Alloy Steel Division, Massillon, Ohio	Enduro 18-8S	17-19	7- 9	Carbon .08 max.	No	Good	Very good[3 4]	18-8S	Good (not mineral acids)
Republic Steel Corporation, Alloy Steel Division, Massillon, Ohio	Enduro 18-8 S Mo	17-19	7-11	2.4 Moly.	No	Good	Very good[3]	18-8S Mo	Very good, some mineral acids
Universal Steel Co., Bridgeville, Penna.	Uniloy 18-8	17-19	7- 9	.....	No	Good	None[1]	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 19-9	18-20	8-10	.....	No	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 21-12	19-22	9-12	.....	No	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 24-11	22-26	11-13	.....	No	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 25-20	24-26	19-21	.....	No	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 18-8 Ti.	17-19	7- 9	Ti 4xCarbon	...	...	...	...	See Note 2
Universal Steel Co., Bridgeville, Penna.	Cyclops No 17 Metal	7-10	19.75-20.75	.....	No	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 1409	12-14	.....	.....	Yes	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 1809	16-18	.....	.....	Yes	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 2009	18-23	.....	.....	Yes	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 2825	23-30	.....	.....	Yes	Good	None	Same material	See Note 2
Universal Steel Co., Bridgeville, Penna.	Uniloy 4-6% Cr.	4- 6	.....	.....	Yes	Good	None	Same material	See Note 2

NOTE:

1. The above grades can be welded by the gas, arc or resistance method but cannot be hammer welded. They can also be soldered with suitable solder.
2. The corrosion resistance of these grades is so varied that it is impossible to cover them in a word or two. Each application must be considered individually relative to its corrosion problems.
3. Satisfactory for arc, gas, resistance, flash.
4. In 18-8 the low carbon is recommended for welding due to better corrosion resistance after welding.
5. Refers to Deep Drawing Qualities.
6. Requires 50% more force for Cold Working than does Straight Carbon Steel.

THE MOST AMAZING SAW EVER INVENTED
BLADES WILL NOT BREAK
CUTS METAL THE FULL LENGTH

Use Standard Blades 12x⅛x.025



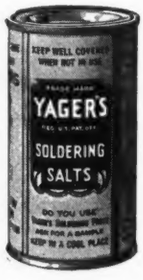
PRICE $2.50 EACH

Frame Moves Horizontally
Blade Moves Diagonally

Send for Circular and Quantity Discounts

"It's All in the Blade Angle"

WARD MACHINERY COMPANY
564 W. Washington Blvd. Chicago, Ill.



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YAGERS
REG. U. S. PATENT OFFICE
SOLDERING SALTS
SAFE ~ FAST
EFFICIENT

AT ALL GOOD JOBBERS IN U. S. AND CANADA
ALEX R. BENSON, INC., HUDSON, N. Y.
MANUFACTURING SINCE 1873

HERO FURNACE
TITAN
CHALLENGE FURNACE
FURNACES

Three trade marks in which you can place entire confidence when selecting a furnace . . . backed by an organization which has successfully manufactured and distributed high-grade warm air heating systems for over 35 YEARS.

Home of Genuine Repair Parts
Phone 385

STANDARD FOUNDRY & FURNACE CO.
DeKalb, Illinois

NATIONAL FURNACE REPAIR PARTS

Will "fit the job" where no other may. Try them on your next job.

Fast shipment—Quality castings—Priced right.

Send for Order Chart, Order Book and Catalog —Free.

NATIONAL FOUNDRY & FURNACE CO.
STATION "B" . . . . . DAYTON, OHIO

PERFECT REPAIRS

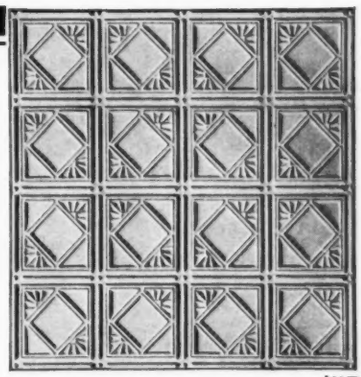
are assured when CAPITOL parts are used . . . everything to fit the furnace—firepots, grates, bars.

Our Catalogue will convince you that-- CAPITOL HAS IT!

CAPITOL FURNACE & STOVE REPAIR CO.

229 S. Meridian, Indianapolis, Ind.

BEAUTY.. QUALITY. VARIETY.



. . . are the three most necessary factors to the success of any steel ceiling line . . . and Canton Steel Ceilings possess all of them. The Canton line can help you develop a large volume of business. With it you can offer your customers a great variety of beautiful patterns for every room and every type of installation. Canton ceilings are practically indestructible . . . will be as permanent as the building itself.

The completeness of the Canton line guarantees that you will have a pattern to please your prospect. It lessens sales resistance and means profits for you.

Write for Canton Sales Helps as well as the New Catalogue F and learn why Canton can make profits for you.

Sold through all leading Sheet Metal jobbers.

CANTON STEEL CEILING COMPANY

2280 WINFIELD WAY, S. E., CANTON, OHIO

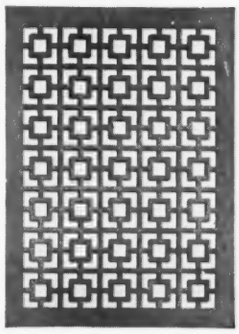
Warehouse Service: 497 West St., New York City, and Canton, Ohio

PERFORATED METALS

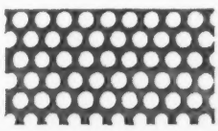
Many designs of Perforated Metal for Architectural Grilles, Radiator Enclosures, Air Conditioners, Cabinets, Safety Guards, and for all screening and sizing operations.

Steel, Stainless Steel, Brass, Bronze, Copper, Monel, Aluminum, Zinc and other metals or materials perforated to your order.

Round holes from .020" to 7". Slot holes from .008 to 3" wide. Square holes of standard sizes. Complete line of brass and tin in small sizes. Prompt Service — Pleasing Prices.



Send us your next specifications.



(Note: Equally spaced holes make for uniform strength, improved appearance and durability.)

The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

ONLY $55.00 NET

complete with standard equipment*

PREMIER FURNACE CLEANER

Here is a powerful, light weight furnace cleaner priced at only $55.00 yet it has many features not found in any other cleaner regardless of price. Equipped with a high speed, ball bearing motor rated at ½ H. P. Built by the world's largest and oldest manufacturer of high quality cleaners. Fully guaranteed. Ruggedly built and dependable, it provides efficient, trouble-free service year in and year out.

*Standard Equipment:

No. 10148—12' Metal Hose	No. 10189—20" Curved Cleaning Tool
No. 731-A—Bristle Brush	No. 53317— 5" Cleaning Nozzle
No. 25177—18' Extension Cable	No. 25054—Blower and Suction Tool
No. 25070—Combination Coupling	No. 25052—Metal Adapter

Write today for complete specifications.

PREMIER FURNACE CLEANER DIVISION

ELECTRIC VACUUM CLEANER CO., INC.

1734 Ivanhoe Road Cleveland, Ohio

Distributors note: A few choice territories still open.

Ventilating System

(*Continued from page 47*)

base section. The fans are located approximately midway down each wing with one duct running toward the outer end and another duct line running toward the front where one fan takes care of most of the base area. The fans are rated 36,000 c.f.m. against ⅜-inch static pressure, but when finally balanced one fan exhausts 36,599 c. f. m. and the other 39,135 c. f. m. The air volumes actually pulled into the ducts through each grille are indicated on the plan.

The installation was made by Mitchum and Schaefer, Inc., Indianapolis, Ind. The contract required about 11,000 pounds of galvanized iron, a volume damper at each opening, one large louvre damper in each of the main exhaust ducts, necessary grilles and two roof pent houses for the blowers and motors.

Pipe Layout

The plan also shows that a material and labor saving layout was devised. Note that each run from the blowers has the same number of openings—11 openings on each of three lines and 10 openings on the fourth. Depth of all ducts is generally 24 inches, increasing in the last three or four sections adjoining the blowers to 32, 38 and 40 inches successively. It was possible under this arrangement to cut practically all side pieces and turn locks in the shop ready for erection on the job.

Gauges of materials vary from 26 for branches up to 12 inches to 20 gauge for ducts from 41 to 60 inches. Wider than 60 inches were built of 18 gauge.

The contractor's procedure for fabrication and erection was designed to take advantage of the simplified layout referred to previously. All ducts were fabricated as two sides, one top and one bottom with cross seams turned in the shop for standing seam drive cleats. Longitudinal seams were double seamed in the shop ready for locking in the building. These pieces were delivered and assembled along the floor. The mechanics locked the sides, top and bottom sections together to form a complete section and lifted these sections to the working platform laid on adjustable trestles.

Branch Openings

Upon being lifted into position the drive cleats were quickly inserted at seam ends and driven in and ends flattened down. Incidently, all surfaces on all but the very smallest sections were cross broken for appearance and extra stiffness. No openings were cut in the side pieces until a complete duct section was ready for hanging; then the branch openings were cut and the elbow stubs were fastened in place.

The system is so laid out that the air flow can be reversed to blow air into the area should cooling be desired at a later date. The fans would have to be turned around and sprays or coils inserted on the intake side. Should cooling be applied it is planned to discharge the cooling water into the factory water system or spray in over the roof as a means of reducing roof temperature.

Every item for the installation of complete warm-air heating systems, both gravity and forced-air.

FURNACES—Cast and Steel	COLD AIR FACES, Steel and Wood
CASINGS	BLOWERS
BONNETS	BOOSTER FANS
FURNACE PIPE AND FITTINGS	TEMPERATURE CONTROLS
STANDARDIZED FORCED-AIR DUCTS	AIR FILTERS
REGISTERS	HUMIDIFIERS
GRILLES	MISCELLANEOUS SUPPLIES

Also manufacturers of the celebrated Excelsior line of Stovepipe and Stovepipe Elbows.

WRITE FOR PRICES

THE EXCELSIOR STEEL FURNACE CO.
118 S. Clinton St. Chicago, Ill.

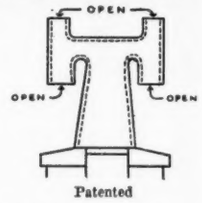
"THE MAGIC" CHIMNEY-VENT

Prevents back draft and faulty drawing in chimneys.

Available in two types, either of which, in its respective use, can be adapted to any type or size of chimney.

NEW CHIMNEYS
"Magic" Vent for new chimneys can be easily and inexpensively installed. It acts as an attractive chimney form with only the neat, small grilled openings showing on opposite sides.

EXISTING CHIMNEYS
This type is of cap-like design that can be snugly and securely fastened over the top of any existing chimney.



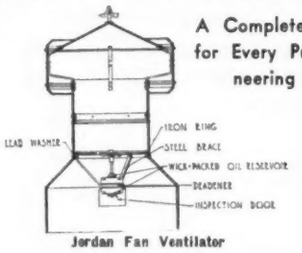
Patented

MATERIALS
The "Magic" Chimney Vent is supplied in galvanized iron, copper, leaded copper, stainless steel or any other workable metal.

Complete prices and installation information will be furnished upon request.

PROVIDENCE CORNICE COMPANY
309 Canal Street Providence, R. I.

JORDAN AERO LINE VENTILATION
Rotary, Storm-Band, Kitchen Fan and Attic Ventilators
FOR GARAGE—FACTORY—SCHOOL—HOME



Jordan Fan Ventilator

A Complete Line of Proved Ventilators for Every Purpose. Backed by an Engineering Service of Unusual Merit.

Ask us for help on any of your ventilation jobs.

Paul R. Jordan & Co.
630 South Delaware St.
INDIANAPOLIS, IND.

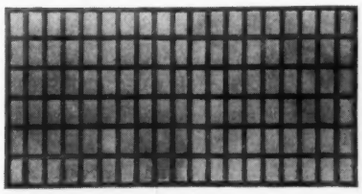
ARMSTRONG FURNACE CO.
COLUMBUS, OHIO

Custom Tailored
Steel Furnaces *for* Cast Furnace Manufacturers

WOOD COLD AIR FACES

FOR BETTER APPEARANCE

Warm Air Heating



Made in Any Size

Air Conditioning

Available in Any Wood

EAGLESFIELD VENTILATOR CO.
920 DORMAN ST. INDIANAPOLIS, IND.

TAMMS ZINC SOOT REMOVER

Cleans and removes soot from
Furnaces—Boilers—Heating stoves—Cook stoves—
Stove Pipes and Chimneys
Stops Chimney Fires

Comes in powder form all ready to use. Assures a perfect draft. Good profit for dealers.

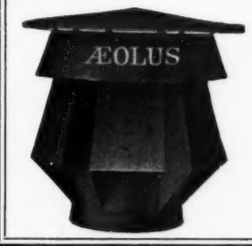
OTHER GOOD PROFIT PRODUCTS FOR YOU

Asbestos Stove & Furnace Lining.
Pyramid Crack Filler.
Cold Water Paints, all grades.
Patching Plaster.

Write for Prices

TAMMS SILICA COMPANY
228 No. La Salle St. Chicago, Ill.

Install ÆOLUS *Improved* VENTILATORS



FOR industrial buildings, schools, homes, theaters, etc. Made in 14 different metals. Constant ventilation—no noise—no upkeep.

ÆOLUS DICKINSON
Industrial Division of Paul Dickinson, Inc.
3332-52 South Artesian Avenue
Chicago, Ill.

IN STOCK

1,000,000 Pounds Furnace Repairs
Pots Grates Feed Sections
1,000,000 Pounds Stove Repairs
Oil Stove Repair Parts & Wicks
Guaranteed To Fit

Fast, Accurate Shipments

METZNER STOVE REPAIR COMPANY
EST. 1880
515 Wyandotte Kansas City, Mo.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

Write for Journal and Stock List

JOSEPH T. RYERSON & SON Inc.
CHICAGO DETROIT MILWAUKEE ST. LOUIS JERSEY CITY CINCINNATI BUFFALO CLEVELAND PHILADELPHIA BOSTON

SHEETS

KEEP OLD MAN WINTER ON THE RUN

XXTH CENTURY HEATING & VENTILATING CO.
AKRON, OHIO

BAGS FOR EVERY PURPOSE

If it's a **FILTER** bag or a **FUME** bag, regardless of size or description, we can supply or manufacture it for you. Bags that last, that are made of only the finest materials, have built for us the reputation of supplying quality merchandise at a fair price. Special bags for definite applications are one of our specialties. Let us solve your bag troubles . . . send us your blueprints.

We Manufacture Bags of:
WOOL, DUCK, SHEETING, NETTING AND CLOSELY WOVEN COTTON

AMERICAN BAG & BUFF MFG. CO.
4056 West Roosevelt Road Chicago, Illinois

Mechanics Say:—

"IT'S THE ANSWER To My Soldering Problems"

TRY IT FREE

Discover the many advantages of using Rubyfluid soldering and Tinning Flux—try it yourself and learn just how it will save time and money by doing a better job easier and quicker. A request on your letterhead will bring a generous free sample by return mail.

PROVEN BEST—BY TEST
WRITE TODAY

THE RUBY CHEMICAL CO.
74 McDowell St., Columbus, Ohio

Rubyfluid

Houses of Steel

(*Continued from page* 48)

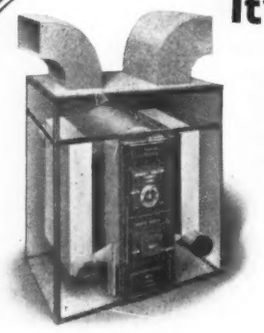
know that the first evidence of their destructive powers only comes to light after the damage has been done.

Fourth—insulation—the kind that actually helps to hold heat in in winter and keep it out during the summer. Insulating material in the fabricated steel house is placed between interior and exterior walls of metal, setting up an effective barrier to the passage of heat. In its simplest form, the modern steel house is ideally adapted to the new trend toward air conditioning of homes.

Basically, there are two kinds of steel houses on the market today. The first type is the steel-frame house, where steel rafters, studs and joists are substituted for wood. The other type is the all-steel house, usually referred to as the frameless method of construction. Here floors and walls consist of a series of cell-like sections or metal boxes, each of which acts as a strong column.

Varied methods of construction are used by the different promoters. Some use pan-shaped sections with interlocking joints which are taken to the site and quickly assembled. Other companies assemble the house in the factory in large sections.

Some people have the impression that all-steel houses must have flat roofs, but it's all a matter of choice. Modern architecture shows a trend toward flat roofs because of simplification, economy and utility, but if a gable roof is preferred, it can be supplied in the steel house.



It's the HEART of the Furnace that Counts

MODERN HEARTH FURNACES are smart in appearance—but even more important is the new square INTERIOR design. For it permits a longer fire travel and greater heating surfaces which increase the efficiency and cut down fuel costs whether coal, gas or oil is burned.

MODERN HEARTH FURNACES with the "Two-Fuel Feature" are the only furnaces built today that can be changed from coal to gas and back again by simply moving a lever! Putting a Modern Hearth or more on your sales floor will cost little, but may mean a great deal more profit for you.

Write for more detailed Information TODAY!

MODERN HEARTH FURNACES

THE THOMPSON MANUFACTURING COMPANY

30TH. & LARIMER STS. SINCE 1878 DENVER, COLO.

Asbestos Insulation

for **Warm Air Heating Air Conditioning**

ASBESTOS PAPERS . . . . ASBESTOS MILLBOARD CORRUGATED AIRCELL PAPER, SHEETS AND BLOCKS

See us at the Chicago Convention and the Stevens Hotel, January 27-31

SALL MOUNTAIN COMPANY

New York Chicago Hamilton, Ohio

VIKING SHEARS

First Aid to Good Workmanship

With Viking Shears, the job-time goes down and the job-profit goes up. And Viking Shears last so long and keep in cutting trim.

VIKING SHEARS

VIKING SHEAR CO. · ERIE, PA.

Send today for complete information.

More per dollar AT THE DRAKE SAYS PITTSBURGH BUSINESS LEADER*

RATES BEGIN AT $3

The DRAKE HOTEL CHICAGO

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. One inch $3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date. Display rates for this page will be furnished on request.

SITUATIONS OPEN

WANTED: Dealers—Distributors. DADCO Automatic Damper (stack limit and draft control for warm air furnaces). Saves fuel. Low price. Non-electrical. Dutcher Heating Company, Canton, Mass.

SELLING AGENTS WANTED in every city by manufacturer of Dual-Power Fans. Wants live wire salesmen to handle their line of Exhaust Fans and Attic Cooling Systems. A real money-making proposition and a real opportunity to grow with an ever increasing business. Write now for complete selling plan. General Regulator Corp., 2608 W. Arthington St., Chicago, Ill.

A Money-making Opportunity. NEW—DIFFERENT. Vik-Air Conditioners and humidifiers are setting new sales records. Design is a year ahead; finest construction that puts competitors on the defensive. Vital features found in no other units. Popularly priced and backed by intelligent, vigorous sales promotion program. Dealers and jobbers write for our unusual proposal. Responsible representatives who will work hard on profitable proposition write us completely about yourselves. VIKING AIR CONDITIONING CORP., CLEVELAND, OHIO.

SALESMEN WANTED: Now contacting Sheet Metal and Furnace dealers and jobbers. To sell outstanding winter air conditioning unit. Commission only. Give experience, lines handled and territory covered. Key 352.

WANTED on or about January 1. First class sheet metal worker; also furnace work and tile roofing. Must be able to lay out his own work. If you can produce we have a good job for you in a live southern town. Key 353.

FOR SALE

FOR SALE: Well equipped Sheet Metal and Roofing Business. Centrally located in San Antonio, Tex. Reason for selling, have other business. Write, Route 1, Box 87, Atascosa, Tex.

FOR RENT OR SALE: Complete set of shop tools. Good location for Sheet Metal shop. Owner deceased. Write to Mrs. Henry Stevens, 33 E. Anderson Street, Rhinelander, Wis.

COMPRESSORS: "Freon" or meythl, ¼ to 15 H. P. Ammonia, 2 to 50 H.P. Born Refrigerating Company, 35 E. Wacker, Chicago.

Manufacturers Agents

MANUFACTURERS WANTING ADditional representation often come to us for names of prospective agents now handling other lines in this field on a commission basis in a definite territory. It will pay you to be on record with us so we can refer your name to interested manufacturers. No charge or obligation, of course. It is a service we render free to manufacturers and representative. Just drop a line that you are interested in being on file and we will send you form to fill out. Address American Artisan, 6 N. Michigan Ave., Chicago, Ill.

If you have anything to sell, if you are looking for a "good buy," if you are seeking a connection or if you are looking for a salesman—use the Classified Page of AMERICAN ARTISAN.

FOR SALE

Sheet Metal Machines
New and *Really Rebuilt*

A machine for every use and every machine is ready for use. The largest stock in Chicago. Ask for list.

Complete supplies and tools.

MAPLEWOOD MACHINERY CO., Inc.
Chicago
2634 W. Fullerton Ave. Brunswick 9200
561 W. Washington Blvd. State 1405

? ? ? ? ? ?
HAVE YOU A SHEET METAL PROBLEM: FORMING—BENDING—PUNCHING—SHEARING
WE HAVE A MACHINE FOR EACH OPERATION ON SHEET METAL
Your Inquiries Earnestly Solicited
WARD MACHINERY CO.
SPECIALISTS
MACHINES — TOOLS — SUPPLIES FOR SHEET METALS
562 W. Washington Boulevard
CHICAGO, ILLINOIS

MISCELLANEOUS

MODERN EQUIPMENT WANTED: Sales engineering company organizing to sell air-conditioning and heating equipment in Chicago territory. Invite correspondence with manufacturers in this field. Air Conditioning & Heating Sales Co., 1021 Harris Trust Bank Building, Chicago.

Patents and Trade Marks
Philip V. W. Peck
Barrister Bldg., Washington, D. C.

MAKE SOME MONEY AND HAVE SOME fun doing it. Put on a minstrel show, play, operetta. Trade and social groups are following the idea successfully with our material—plays, operettas, musical comedies, minstrels, comedy and revue songs, blackface skits, vaudeville plays and songs, musical readings and other entertainments; make-up goods. Catalog free. T. S. Denison & Co., 623 So. Wabash. Dept. 26, Chicago.

HOT DIP tinning of milk cans or any manufactured articles requiring tinning, galvanizing or lead coating, is profitable throughout the year. Write for our new circular showing how you can build your own equipment at small cost. Valuable information and instructions furnished free with purchase of necessary supplies. Retinning Mfg. Co., 3021 Greenview, Chicago, Illinois.

SCHAEFER *PLUS VALUE*

BRUSHES

First in the field for

- FURNACE BRUSHES
- FLUE AND BOILER BRUSHES
- ALLIED INDUSTRIAL BRUSHES

that handle easily and wear hard. Send for the Schaefer catalog.

Industrial Brushes Since 1905

SCHAEFER BRUSH MFG. CO. 1009 S. 2nd St. Milwaukee, Wisconsin

Liquidating Private Plant—
THIS IS YOUR OPPORTUNITY TO SAVE!

—Write for—
Bargain Bulletin No. 835-A

DON'T Let Your Surplus Machinery Stand Idle.

TRADE IT IN On Interstate - Guaranteed - Reconditioned Equipment.

We Carry America's Largest Stock Modern Machinery at prices that will suit your bank book. Let us quote.

LOOK AT THESE VALUES!

32" Pexto Corrugating Roll, $150.00.
30" Bertsch Foot Shear for corrugating sheets, $100.00.
Power Shear, 10' 3/16" Cleveland M. D., $1,250.00.
Power Shear, 42" 10 ga. Niagara.
Shears Foot, 8' 20 ga. Pexto; 52" Nia.; 30" Nia. 20 ga.
Brake Power Apron, Chgo. Steel, 10' 10 ga.
Brakes, Hand, Chgo. St., 10' 14 ga.; 8' 16; 4' 16.
Brakes, B and P, 3' and 5' 14 ga.
Brake Slitter, 8' C. DeWitt Wagner, $15.00.
Gutter Former with forms and rods, 10' Elec. City, $90.00.
Angle Iron Shear, No. 3 Kidder, $22.50.
Press Brake, 6' 12 ga. Gap Type M. D., $650.00.
Punches, Single End, 15" throat and 48" throat.
Punch, Hand Clough, 18" throat, $45.00.
5 Folders, 30" and 42" Pexto, Nia.
Scroll Shear, 12" throat, $25.00.
Bending Rolls, 36"x3" Nia., $75.00; 10' Bertsch, $225.00.
Furnace Collar Casing Roll, $160.00.
Welders, Spot, 5 kw Welco $100.00; 25 kva Thomson $225.00.
Welders, Arc, 200 Amp Zues, $125.

Suggest Immediate Action! These exceptional tools will be sold at once.
Write, wire or phone.
"Draw on the Most Complete Stock in America"

INTERSTATE MACHINERY COMPANY
130 S. Clinton St. - - - Chicago
(FREE PARKING)

Index to Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with an asterisk.

January, 1936

AMERICAN ARTISAN

1936 DIRECTORY NUMBER

Section 1.—Products Classified

Section 2.—Trade Names

Section 3.—Manufacturers' Addresses

HOW TO USE THIS DIRECTORY

If you want to know the names of one or more manufacturers making a certain product, look in Section I, where that product will appear in its proper place in the listing. If you have the trade name of a product and want to know who manufactures it, look in Section 2, where trade names are alphabetically listed. For the complete name and address of any manufacturer look in Section 3.

● The manufacturers whose names are starred throughout the listing advertise their products in this issue. Turn to Index to Advertisers, page 154, for the page on which you will find the advertising of any of these manufacturers.

American Artisan

1936 DIRECTORY NUMBER

Section 1—PRODUCTS CLASSIFIED

AIR CONDITIONING CONTROLS

See Controls; Heating, Ventilating and Air Conditioning Systems, Fan and Limit, Combustion, Limit, Thermostats, Humidistats

AIR CONDITIONING FURNACES

(Matched Furnace-fan-filter-humidifier unit)

See Furnaces, Air Conditioning

AIR CONDITIONING REGISTERS

See Registers, Air Conditioning

AIR CONDITIONING UNITS, CENTRAL SYSTEM BOILER TYPE

(Self-contained fan-filter-humidifier-heat transfer surface unit for connection to steam or hot water, refrigeration)

- Air Conditioning Equipment Corp., Minneapolis, Minn.
- Airtemp, Inc., Detroit, Mich.
- American Blower Corp., Detroit, Mich.
- American Radiator Co., New York City
- Ames Co., W. R., San Francisco, Cal.
- Autovent Fan & Blower Co., Chicago, Ill.
- Betz Unit Air Cooler Co., Kansas City, Mo.
- Bishop & Babcock Sales Co., Cleveland, O.
- Bryant Heater Co., Cleveland, O.
- Buffalo Forge Co., Buffalo, N. Y.
- Carraway Engineering Co., Inc., Dallas, Tex.
- Clarage Fan Co., Kalamazoo, Mich.
- Dail Steel Products Co., Lansing, Mich.
- Electrol, Inc., Clifton, N. J.
- Fairbanks, Morse & Co., Chicago, Ill.
- General Electric Co., Schenectady, N. Y.
- General Refrigeration Sales Co., Beloit, Wis.
- Heil Co., Milwaukee, Wis.
- Hubbard Co., Minneapolis, Minn.
- Howes Co., S. M., Boston, Mass.
- Joliet Heating Corp., Joliet, Ill.
- Kelvinator Corp., Detroit, Mich.
- Lewis Air Conditioners, Inc., Minneapolis, Minn.
- May Oil Burner Corp., Baltimore, Md.
- McCormick & Co., J. H., Williamsport, Pa.
- Mellish & Murray Co., Chicago, Ill.
- Merion Sporting Goods Mfg. Corp., Philadelphia, Pa.
- Merrill Co., Inc., Boston, Mass.
- National Fan & Blower Corp., Chicago, Ill.
- Nelson Co., Detroit, Mich.
- Nelson Corp., Herman, Moline, Ill.
- Nesbitt, Inc., John J., Philadelphia, Pa.
- Niagara Blower Co., New York City.
- Norge Heating & Conditioning Division of Borg-Warner Corp., Detroit, Mich.
- Robeson Engineering Co., East Orange, N. J.
- Russell Electric Co., Chicago, Ill.
- Savage Arms Corp., New York City.
- Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
- Syncromatic Air Conditioning Corp., Milwaukee, Wis.
- Thermal Units Mfg. Co., Chicago, Ill.
- Trane Co., La Crosse, Wis.
- Unified Air Conditioner Co., Duluth, Minn.
- United States Radiator Corp., Detroit, Mich.
- Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
- Wood Industries, Inc., Gar, Detroit, Mich.
- York Ice Machinery Corp., York, Pa.
- York Oil Burner Co., Inc., York, Pa.
- Young Radiator Co., Racine, Wis.

AIR CONDITIONING UNITS, CENTRAL SYSTEM, FURNACE TYPE

(Self-contained fan-filter-washer or humidifier unit for warm air furnaces)

- American Blower Corp., Detroit, Mich.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- American Machine Products Co., Marshalltown, Ia.
- Ames Co., W. R., San Francisco, Cal.
- Armstrong Furnace Co., Columbus, O.
- Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
- Autovent Fan & Blower Co., Chicago, Ill.
- Bergstrom Mfg. Co., Neenah, Wis.
- Bishop & Babcock Sales Co., Cleveland, O.
- Brundage Co., Kalamazoo, Mich.
- Bryan Plumbing & Heating Co., Bryan, O.
- Bryant Heater Co., Cleveland, O.
- Campbell Heating Co., Des Moines, Ia.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Carraway Engineering Co., Inc., Dallas, Tex.
- Carrier Engineering Corp., Newark, N. J.
- Chandler Co., Cedar Rapids, Ia.
- Columbus Heating & Ventilating Co., Columbus, O.
- Columbus Humidifier Co., Columbus, O.
- Dail Steel Products Co., Lansing, Mich.
- Delco Appliance Corp., Rochester, N. Y.
- Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Economy Baler Co., Ann Arbor, Mich.
- Evans Corp., George, Moline, Ill.
- Fairbanks, Morse & Co., Chicago, Ill.
- Farris Furnace Co., Springfield, Ill.
- Farquhar Furnace Co., Wilmington, O.
- Favorite Mfg. Co., Piqua, O.
- Forest City Foundries Co., Cleveland, O.
- Fox Furnace Co., Elyria, O.
- Frigidaire Corp., Dayton, O.
- Furblo Co., Hermansville, Mich.
- Gehri Co., Tacoma, Wash.
- Gilbert & Barker Mfg. Co., Springfield, Mass.
- Green Foundry & Furnace Works, Des Moines, Ia.
- Hall-Neal Furnace Co., Indianapolis, Ind.
- Health Air Systems, Inc., Detroit, Mich.
- Heil Co., Milwaukee, Wis.
- Henry Furnace & Foundry Co., Cleveland, O.
- Hess Warming & Ventilating Co., Chicago, Ill.
- Holland Furnace Co., Holland, Mich.
- Home Furnace Co., Holland, Mich.
- Hotentot Co., Inc., Omaha, Nebr.
- Howes Co., S. M., Charlestown, Boston, Mass.
- Hubbard Co., Minneapolis, Minn.
- Ideal Furnace Co., Detroit, Mich.
- International Engineering, Inc., Dayton, O.
- International Heater Co., Utica, N. Y.
- Jaden Mfg. Co., Inc., F., Hastings, Nebr.
- Joliet Heating Corp., Joliet, Ill.
- Keith Furnace Co., Des Moines, Ia.
- Lau Heating Service, Inc., Dayton, O.
- Leeson Co., T. F., Detroit, Mich.
- Lennox Furnace Co., Marshalltown, Ia.
- MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
- May Oil Burner Corp., Baltimore, Md.
- Marshall Furnace Co., Marshall, Mich.
- Mellish & Murray Co., Chicago, Ill.
- McPherson Furnace & Supply Co., Portland, Ore.
- Meyer Furnace Co., Peoria, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- National Fan & Blower Corp., Chicago, Ill.
- Nelson Co., Detroit, Mich.
- Nelson Corp., Herman, Moline, Ill.
- Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
- Pacific Gas Radiator Co., Huntington Park, Cal.
- Peerless Foundry Co., Indianapolis, Ind.
- Perfection Stove Co., Cleveland, O.
- Premier Furnace Co., Dowagiac, Mich.
- Robeson Engineering Co., East Orange, N. J.
- Robinson Furnace Co., Chicago, Ill.
- Rock Island Stove Co., Rock Island, Ill.
- Round Oak Co., Dowagiac, Mich.
- Rudy Furnace Co., Dowagiac, Mich.
- Russell Electric Co., Chicago, Ill.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Surface Combustion Corp., Toledo, O.
- Thatcher Co., Newark, N. J.
- Trane Co., La Crosse, Wis.
- Twentieth Century Heating & Ventilating Co., Akron, O.
- Unified Air Conditioner Co., Duluth, Minn.
- U. S. Air Conditioning Corp., Minneapolis, Minn.
- U. S. Pressed Steel Products Co., Kalamazoo, Mich.
- Viking Air Conditioning Corp., Cleveland, O.

●Waterman-Waterbury Co., Minneapolis, Minn.
Wayne Oil Burner Corp., Fort Wayne, Ind.
Western Blower Co., Seattle, Wash.
●XXth Century Heating & Ventilating Co., Akron, O.
●York Oil Burner Co., Inc., York, Pa.

AIR CONDITIONING UNITS, ROOM TYPE, SUMMER

(Cabinet or suspended for cooling, circulating and cleaning)

Airtemp, Inc., Detroit, Mich.
American Blower Corp., Detroit, Mich.
Barrett Regulation Engineers Co., Cleveland Heights, O.
Betz Unit Air Cooler Co., Kansas City, Mo.
●Buffalo Forge Co., Buffalo, N. Y.
Burnham Boiler Corp., Irvington, N. Y.
●Campbell Heating Co., E. K., Kansas City, Mo.
Carbondale Machine Corp., Harrison, N. J.
Carraway Engineering Co., Inc., Dallas, Tex.
Carrier Engineering Corp., Newark, N. J.
●Clarage Fan Co., Kalamazoo, Mich.
Comfort Systems, Inc., Cincinnati, O.
Corozone Air Conditioning Corp., Cleveland, O.
De La Vergne Engine Co., Philadelphia, Pa.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Fairbanks, Morse & Co., Chicago, Ill.
Fedders Mfg. Co., Buffalo, N. Y.
FitzGibbon & Crisp, Inc., Trenton, N. J.
Frigidaire Corp., Dayton, O.
●General Electric Co., Schenectady, N. Y.
General Refrigeration Sales Co., Beloit, Wis.
Grinnell Co., Inc., Providence, R. I.
Humidi-Cooler Corp., New Haven, Conn.
Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Corp., Detroit, Mich.
King Ventilating Co., Owatonna, Minn.
Lewis Air Conditioners, Inc., Minneapolis, Minn.
McCormick & Co., J. H., Williamsport, Pa.
Meier Electric & Machine Co., Indianapolis, Ind.
Modine Mfg. Co., Racine, Wis.
Myco Mfg. Co., Detroit, Mich.
National Fan & Blower Corp., Chicago, Ill.
Nelson Corp., Herman, Moline, Ill.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York City
Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
Savage Arms Corp., New York City
Servel, Inc., Evansville, Ind.
Standard Air Conditioning, Inc., New York City
Thermal Units Mfg. Co., Chicago, Ill.
Trane Co., La Crosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.
Westinghouse Electric & Mfg. Co., Mansfield, O.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

AIR CONDITIONING UNITS, ROOM TYPE, WINTER

(Cabinet or suspended for heating, humidifying, circulating and cleaning)

Airtemp, Inc., Detroit, Mich.
American Blower Corp., Detroit, Mich.
Barrett Regulation Engineers Co., Cleveland Heights, O.
Betz Unit Air Cooler Co., Kansas City, Mo.
●Buffalo Forge Co., Buffalo, N. Y.
Burnham Boiler Corp., Irvington, N. Y.
●Campbell Heating Co., E. K., Kansas City, Mo.
Carraway Engineering Co., Inc., Dallas, Tex.
Carrier Engineering Corp., Newark, N. J.
●Clarage Fan Co., Kalamazoo, Mich.
Corozone Air Conditioning Corp., Cleveland, O.
Fairbanks, Morse & Co., Chicago, Ill.
Frick Co., Inc., Waynesboro, Pa.
Frigidaire Corp., Dayton, O.
●General Electric Co., Schenectady, N. Y.
Grinnell Co., Inc., Providence, R. I.
Health Air Systems, Inc., Detroit, Mich.
Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Lewis Air Conditioners, Inc., Minneapolis, Minn.
National Fan & Blower Corp., Chicago, Ill.
Merion Sporting Goods Mfg. Corp., Philadelphia, Pa.
Modine Mfg. Co., Racine, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Myco Mfg. Co., Detroit, Mich.
Nelson Corp., Herman, Moline, Ill.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York City.
Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
Savage Arms Corp., New York City
Standard Air Conditioning, Inc., New York City
Summerheat Co., South Bend, Ind. (Cabinet)
Thermal Units Mfg. Co., Chicago, Ill.
Trane Co., La Crosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.
Westinghouse Electric & Mfg. Co., Mansfield, O.
Young Radiator Co., Racine, Wis.

AIR CONDITIONING UNITS, ROOM TYPE, YEAR AROUND

(Cabinet or suspended for heating, cooling, humidifying, dehumidifying, circulating and cleaning)

Airtemp, Inc., Detroit, Mich.
American Blower Corp., Detroit, Mich.
Barrett Regulation Engineers Co., Cleveland Heights, O.
Betz Unit Air Cooler Co., Kansas City, Mo.
●Buffalo Forge Co., Buffalo, N. Y.
Burnham Boiler Corp., Irvington, N. Y.
Carbondale Machine Corp., Harrison, N. J.
Carraway Engineering Co., Inc., Dallas, Tex.
Carrier Engineering Corp., Newark, N. J.
●Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Corozone Air Conditioning Corp., Cleveland, O.
De La Vergne Engine Co., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frick Co., Inc., Waynesboro, Pa.
Frigidaire Corp., Dayton, O.
●General Electric Co., Schenectady, N. Y.
Grinnell Co., Inc., Providence, R. I.
Hardy Mfg. Co., Dayton, O.
Ilg Electric Ventilating Co, Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Corp., Detroit, Mich.
Lewis Air Conditioners, Inc., Minneapolis, Minn.
McCormick & Co., J. H., Williamsport, Pa.
Meier Electric & Machine Co., Indianapolis, Ind.
Miller Conditionair, Inc., Los Angeles, Cal.
National Fan & Blower Corp., Chicago, Ill.
Nesbitt Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York City
Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
Savage Arms Corp., New York City
Standard Air Conditioning, Inc., New York City
Thermal Units Mfg. Co., Chicago, Ill.
Trane Co., La Crosse, Wis.
Truscon Steel Co., Youngstown, O.
Unified Air Conditioner Co., Duluth, Minn.
Westinghouse Electric & Mfg. Co., Mansfield, O.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

AIR FILTERS

See Filters, Air

AIR WASHERS

See Washers, Air

ALLOY PLATES

See Plates, Alloy

ALLOY SHEETS

See Sheets, Alloy

ANGLES, BARS, BEAMS, CHANNELS AND TEES (STRUCTURAL SHAPES)

Aluminum Company of America, Pittsburgh, Pa.
Allegheny Steel Co., Brackenridge, Pa. (Stainless)
●American Brass Co., Waterbury, Conn. (Copper Alloy)
Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa. (Wrought Iron)
Brasco Mfg. Co., Harvey, Ill. (Cold Rolled Only)
Carnegie-Illinois Steel Co., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Columbia Steel Co., San Francisco, Cal.
Decatur Iron & Steel Co., Decatur, Ala.
Gulf States Steel Co., Birmingham, Ala. (Angles, Bars, Channels)
Inland Steel Co., Chicago, Ill.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Mesker & Co., Geo. L., Evansville, Ind.
●Milcor Steel Co., Milwaukee, Wis.
National Steel Corp., Pittsburgh, Pa.
●Republic Steel Corp., Cleveland, O.
Standard Galvanizing Co., Chicago, Ill.
Steel and Tubes, Inc., Cleveland, O. (Channels, Tubing, U-bars)
Stran-Steel Corp., Detroit, Mich.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Truscon Steel Co., Youngstown, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

ARC WELDERS

See Welders, Arc, Spot

ASBESTOS PAPER

See Paper, Asbestos

AUTOMATIC COAL BURNERS

See Stokers

AUTOMATIC HUMIDIFIERS

See Humidifiers, Furnace, Evaporation, Spray

BAGS, FUME AND FILTER

●American Bag & Buff Co., Chicago, Ill.

BARS

See Angles, Bars, Beams, Channels and Tees (Structural Shapes)

BASES, COMPRESSOR, FAN, MOTOR, VIBRATION ELIMINATING

Armstrong Cork Products Co., Lancaster, Pa. (Cork)
●Buffalo Forge Co., Buffalo, N. Y.
●Clarage Fan Co., Kalamazoo, Mich. (Rubber noise isolating bases)
Goodrich Co., B. F., Akron, O. (Rubber)
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
●Lau Heating Service, Inc., Dayton, O.
Lord Mfg. Co., Erie, Pa.
Mundet Cork Corp., New York City.
Peerless Ice Machine Co., Chicago, Ill. (Floating motor base)
Rockwood Mfg. Co., Indianapolis, Ind. (Pivoted motor)
United States Gypsum Co., Chicago, Ill. (Motor, Vibration Eliminating)
Vibration Eliminator Co., Long Island City, N. Y. (Cork and spring)
Vilter Mfg. Co., Milwaukee, Wis.
Western Felt Works, Chicago, Ill. (Felt)
Westinghouse Electric & Mfg. Co., Mansfield, O.

BEAMS

See Angles, Bars, Beams, Channels and Tees (Structural Shapes)

BEARINGS, FAN

●Air Controls, Inc., Cleveland, O.
American Blower Corp., Detroit, Mich. (Pillow block)
●Clarage Fan Co., Kalamazoo, Mich.
Fafnir Bearing Co., New Britain, Conn. (Ball)
Frick Co., Inc., Waynesboro, Pa. (Pillow block)
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Jaden Mfg. Co., Inc., F., Hastings, Nebr. (for furnace blowers)
Jones Fdry. & Mach. Co., W. A., Chicago, Ill.
Medart Co., St. Louis, Mo.
New Departure Mfg. Co., Bristol, Conn. (Ball)
Norma-Hoffman Bearings Corp., Stamford, Conn. (Ball, Roller)
●Randall Graphite Products Corp., Chicago, Ill. (Pillow blocks)
Roller Bearing Co. of America, Trenton, N. J.
●Schwitzer-Cummins Co., Indianapolis, Ind. (Pillow block)
S K F Industries, Inc., Philadelphia, Pa. (Ball and Roller, Pillow blocks)
Viking Air Conditioning Corp., Cleveland, O. (Rubber-mounted, self-aligning)
Western Blower Co., Seattle, Wash.

BELTS, FLAT

Alexander Bros., Philadelphia, Pa.
Continental Rubber Works, Erie, Pa. (Rubber and Fabric)
Dick Co., Inc., R. & J., Passaic, N. J. (Balata and Rubber)
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O. (Rubber)
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight, Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Rhodes & Sons, J. E., Philadelphia, Pa. (Leather)
Thermoid Rubber Co., Trenton, N. J. (Rubber)

BELTS, V-TYPE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.
Medart Co., St. Louis, Mo.
Ohio Valley Pulley Works, Maysville, Ky.
Pyott Foundry & Machine Co., Chicago, Ill.
Rockwood Mfg. Co., Indianapolis, Ind.
Thermoid Rubber Co., Trenton, N. J.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

BLADES, FAN

Aerovent Fan Co., Piqua, O.
Airmaster Corp., Chicago, Ill.
Campbell Heating Co., Des Moines, Ia.
Champion Blower & Forge Co., Lancaster, Pa.
●Clarage Fan Co., Kalamazoo, Mich.
Economy Electric Mfg. Co., Cicero, Ill.
Janette Mfg. Co., Chicago, Ill.
●Lau Heating Service, Inc., Dayton, O.
Myers Electric Co., Pittsburgh, Pa.
National Fan & Blower Corp., Chicago, Ill.
●Peerless Electric Co., Warren, O.
Servel, Inc., Evansville, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Steel and Tubes, Inc., Cleveland, O. (Stamping)
Torrington Mfg. Co., Torrington, Conn.
Victor Electric Products, Inc., Cincinnati, O.

BLAST GATES

Airtherm Mfg. Co., St. Louis, Mo.
●Berger Bros. Co., Philadelphia, Pa.
●Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
●Clarage Fan Co., Kalamazoo, Mich.
Garden City Fan Co., Chicago, Ill.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Goethel Co., Alfred C., Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Western Blower Co., Seattle, Wash.

BLOWER—FILTER UNITS

●Air Controls, Inc., Cleveland, O.
Aladdin Heating Corp., Oakland, Cal.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Machine Products Co., Marshalltown, Ia.
Ames Co., W. R., San Francisco, Cal.
Arcweld Mfg. Co., Seattle, Wash.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bishop & Babcock Sales Co., Cleveland, O.
Brown Sheet Iron & Steel Co., St. Paul, Minn.
Brundage Co., Kalamazoo, Mich.
Bryan Plumbing & Heating Co., Bryan, O.
●Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
●Dail Steel Products Co., Lansing, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Economy Baler Co., Ann Arbor, Mich.
Emerson Electric Mfg. Co., St. Louis, Mo.
Evans Corp., George, Moline, Ill.
Farquhar Furnace Co., Wilmington, O.
●Fox Furnace Co., Elyria, O.
●Furbio Co., Hermansville, Mich.
Gehri Co., Tacoma, Wash.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Health Air Systems, Inc., Detroit, Mich.
●Hess Warming & Ventilating Co., Chicago, Ill.
●"Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Kelsey Heating Co., Syracuse, N. Y.
Kruse Co., Inc., Indianapolis, Ind.
●Lau Heating Service, Inc., Dayton, O.
●Lennox Furnace Co., Marshalltown, Ia.
Lewis Air Conditioners, Inc., Minneapolis, Minn.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Marshall Furnace Co., Marshall, Mich.
McPherson Furnace & Supply Co., Portland, Ore.
Mellish & Murray Co., Chicago, Ill.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Nelson Co., Detroit, Mich.
Nelson Corp., Herman, Moline, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Peerless Electric Co., Warren, O.
●Peerless Foundry Co., Indianapolis, Ind.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Perfect Burner Co., Lynn, Mass.
Premier Furnace Co., Dowagiac, Mich.
Roberts-Hamilton Co., Minneapolis, Minn.
Robeson Engineering Co., East Orange, N. J.
●Round Oak Co., Dowagiac, Mich.
●Rudy Furnace Co., Dowagiac, Mich.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Surface Combustion Corp., Toledo, O.
Texo Sales & Mfg. Co., Cincinnati, O.
Thatcher Co., Newark, N. J.
U. S. Air Conditioning Corp., Minneapolis, Minn.
Viking Air Conditioning Corp., Cleveland, O.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.

BLOWER—WASHER UNITS

●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Machine Products Co., Marshalltown, Ia.
Ames Co., W. R., San Francisco, Cal.
Arcweld Mfg. Co., Seattle, Wash.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bishop & Babcock Sales Co., Cleveland, O.
Brown Sheet Iron & Steel Co., St. Paul, Minn.
Brundage Co., Kalamazoo, Mich.
Bryan Plumbing & Heating Co., Bryan, O.
●Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
Carrier Engineering Corp., Newark, N. J.
●Dail Steel Products Co., Lansing, Mich.

Dowagiac Steel Furnace Co., Dowagiac, Mich.
Economy Baler Co., Ann Arbor, Mich.
Emerson Electric Mfg. Co., St. Louis, Mo.
●Furblo Co., Hermansville, Mich.
Gehri Co., Tacoma, Wash.
Green Foundry & Furnace Works, Des Moines, Ia.
Health Air Systems, Inc., Detroit, Mich.
●Lau Heating Service, Inc., Dayton, O.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Mellish & Murray Co., Chicago, Ill.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Fan & Blower Corp., Chicago, Ill.
Nelson Co., Detroit, Mich.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Robeson Engineering Co., East Orange, N. J.
●Round Oak Co., Dowagiac, Mich.
●Rudy Furnace Co., Dowagiac, Mich.
Stilphen Engineering & Mfg. Co., C. A., Denver, Colo.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
U. S. Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
●Waterman-Waterbury Co., Minneapolis, Minn.

BLOWERS, FORCED DRAFT, FOR COAL BURNING

American Blower Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
Bignall Co., Medina, N. Y.
Brown Corp., Syracuse, N. Y.
●Buffalo Forge Co., Buffalo, N. Y.
Burnwell Corp., Allentown, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Coppus Engineering Corp., Worcester, Mass.
Delco Appliance Corp., Rochester, N. Y.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
Health Air Systems, Inc., Detroit, Mich.
Mohler Co., J. K., Ephrata, Pa.
Muncie Gear Works, Inc., Muncie, Ind.
New York Blower Co., Chicago, Ill.
●Peerless Electric Co., Warren, O.
Roberts-Hamilton Co., Minneapolis, Minn.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Universal Blower Co., Birmingham, Mich.
Wing Mfg. Co., L. J., New York City

BLOWERS, FURNACE, CENTRIFUGAL

●Air Controls, Inc., Cleveland, O.
American Blower Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Machine Products Co., Marshalltown, Ia.
Ames Co., W. R., San Francisco, Cal.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
●Autovent Fan & Blower Co., Chicago, Ill.
Bishop & Babcock Sales Co., Cleveland, O.
Brown Sheet Iron & Steel Co., St. Paul, Minn.
Brundage Co., Kalamazoo, Mich.
Bryan Plumbing & Heating Co., Bryan, O.
●Buffalo Forge Co., Buffalo, N. Y.
●Campbell Heating Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Champion Blower & Forge Co., Lancaster, Pa.
●Chandler Co., Cedar Rapids, Ia.
●Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
●Dail Steel Products Co., Lansing, Mich.
Economy Baler Co., Ann Arbor, Mich.
Emerson Electric Mfg. Co., St. Louis, Mo.
●Furblo Co., Hermansville, Mich.
Garden City Fan Co., Chicago, Ill.
Gehri Co., Tacoma, Wash.
General Blower Co., Philadelphia, Pa.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
●Hess Warming & Ventilating Co., Chicago, Ill.
●"Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Ideal Furnace Co., Detroit, Mich.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Janette Mfg. Co., Chicago, Ill.
●Lau Heating Service, Inc., Dayton, O.
Mahr Mfg. Co., Minneapolis, Minn.
Marshall Furnace Co., Marshall, Mich.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Fan & Blower Corp., Chicago, Ill.
Nelson Co., Detroit, Mich.
Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York City
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Peerless Electric Co., Warren, O.
Premier Furnace Co., Dowagiac, Mich.
Robeson Engineering Co., East Orange, N. J.
Security Stove & Mfg. Co., Kansas City, Mo.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Spear Stove & Heating Co., Jas., Philadelphia, Pa.
Surface Combustion Corp., Toledo, O.
U. S. Air Conditioning Corp., Minneapolis, Minn.
Viking Air Conditioning Corp., Cleveland, O.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.
Wing Mfg. Co., L. J., New York City

BLOWERS, VENTILATING SYSTEM

(Capacity 4,000 c.f.m. up)

Alladin Heating Corp., Oakland, Cal.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
●American Foundry & Furnace Co., Blommington, Ill.
Ames Co., W. R., San Francisco, Cal.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
●Autovent Fan & Blower Co., Chicago, Ill.
Barrett Regulation Engineers Co., Cleveland Heights, O.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Sales Co., Cleveland, O.
Brown Sheet Iron & Steel Co., St. Paul, Minn.
Brundage Co., Kalamazoo, Mich.
●Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
●Campbell Heating Co., E. K., Kansas City, Mo.
Champion Blower & Forge Co., Lancaster, Pa.
●Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
De Bothezat Corp., New York City
Duriron Co., Inc., Dayton, O. (Acid Resisting)
Economy Electric Mfg. Co., Cicero, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
Evry-Use Products, Inc., New York City
●Furblo Co., Hermansville, Mich.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Hartzell Propeller Fan Co., Piqua, O.
Health Air Systems, Inc., Detroit, Mich.
Ilg Electric Ventilating Co., Chicago, Ill.
Johnson Fan & Blower Corp., Chicago, Ill.
●Lau Heating Service, Inc., Dayton, O.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Mechanical Air, Little Rock, Ark.
National Fan & Blower Corp., Chicago, Ill.
Nelson Co. Detroit, Mich.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York City
●Pacific Gas Radiator Co., Huntington Park, Cal.
Perkins & Son, Inc., B. F., Holyoke, Mass.
Peterson Freezem Mfg. Co., Kansas City, Mo.
Roberts-Hamilton Co., Minneapolis, Minn.
●Round Oak Co., Dowagiac, Mich.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Star Electric Motor Co., Bloomfield, N. J.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
U. S. Air Conditioning Corp., Minneapolis, Minn.
●Victor Electric Products, Inc., Cincinnati, O.
Western Blower Co., Seattle, Wash.
Wing Mfg. Co., L. J., New York City

BLOWER WHEELS

See Wheels, Blower

BLOW PIPE EQUIPMENT

See Blast Gates; Collectors, Blow Pipe; Fittings, Blow Pipe

BLOW TORCHES

See Torches, Brazing, Cutting, Welding, Soldering

BOOSTER FANS

See Fans, Booster

BOOTS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

BRAKES, METAL WORKERS'

Alsteel Press Co., Inc., Chicago, Ill. (Power)
Bertsch & Co., Cambridge City, Ind.
Cincinnati Shaper Co., Cincinnati, O.
●Dreis & Krump Mfg. Co., Chicago, Ill.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Rafter Machine Co., Belleville, N. J.
Steelweld Machinery Co., Cleveland, O.
●Whitney Metal Tool Co., Rockford, Ill.

BRAZING TORCHES

See Torches, Brazing, Cutting, Welding

BRUSHES, ACID

Cleveland Acid Swab Co., Lakewood, O.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
●Milcor Steel Co., Milwaukee, Wis.
Milwaukee Brush Mfg. Co., Milwaukee, Wis.
Osborn Mfg. Co., Cleveland, O.
Potomac Mfg. Co., Philadelphia, Pa.
●Schaefer Brush Mfg. Co., Milwaukee, Wis.

BRUSHES, FURNACE

●Metzner Stove Repair Co., Kansas City, Mo.
Mill-Rose Co., Cleveland, O.
Milwaukee Brush Mfg. Co., Milwaukee, Wis.
Osborn Mfg. Co., Cleveland, O.
Beck Engineering Kompany, St. Louis, Mo.
●Schaefer Brush Mfg. Co., Milwaukee, Wis.
Swift Corp., Carl E., Holland, Mich.
Worcester Brush & Scraper Co., Worcester, Mass.

BURNERS, GAS, CONVERSION

American Gas Appliance Co., Chicago, Ill.
American Gas Products Corp., New York City
Autogas Corp., Chicago, Ill.
●Barber Gas Burner Co., Cleveland, O.
Beck Engineering Combination Kompany, St. Louis, Mo.
Bennett Corp., W. M., Omaha, Nebr.
Bryan Steam Corp., Peru, Ind.
Bryant Corp., C. L. Cleveland, O.
Bryant Heater Co., Cleveland, O.
Burdett Mfg. Co., Chicago, Ill.
Columbia Burner Co., Toledo, O.
Continental Stove Corp., Ironton, O.
Franklin Gas Appliance Co., Cincinnati, O.
Jackson Sheet Metal Works, Ogden, Utah
Leahy Mfg. Co., Los Angeles, Cal.
R-S Products Corp., Philadelphia, Pa.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Rotary Mfg. Co., Los Angeles, Cal.
Security Stove & Mfg. Co., Kansas City, Mo.
Sonner Burner Co., Winfield, Kan.
Standard Heating & Radiator Co., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, O.

BURNERS, OIL

Ace Engineering Co., Chicago, Ill. (Rotary)
Anchor Post Fence Co., Baltimore, Md. (Gun and rotary)
Auburn Burner Corp., Auburn, Ind. (Gun and rotary)
Autocrat Oil Burner Corp., Cedar Rapids, Ia.
Automatic Burner Corp., Chicago, Ill. (Gun and rotary)
Badger Mfg. Co., Madison, Wis. (Gun)
Ballard, Inc., Arthur H., Boston, Mass.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
Bennett Corp., W M., Omaha, Nebr. (Gun)
Berryman Oil Burner Co., Chicago, Ill.
Bethlehem Foundry & Machine Co., Bethlehem, Pa. (Gun)
Braden Engineering, Inc., Providence, R. I. (Pressure gun)
Brigham Oil Burner Co., St. Louis, Mo. (Gun and gravity)
Brown Oil Burning Equipment Co., Cambridge, Mass. (Gun and rotary)
Bryan Steam Corp., Peru, Ind. (Rotary)
Caloroil Burner Corp., Hartford, Conn. (Atmospheric, gun, horizontal, rotary, vacuum pressure, wall flame)
Carey Mfg. Co., Waupaca, Wis. (Gravity)
Century Engineering Corp., Cedar Rapids, Ia. (Gun)
Chalmers Oil Burner Co., Minneapolis, Minn. (Gun)
Cleveland Steel Products Corp., Cleveland, O. (Gun and rotary)
Delco Appliance Corp., Rochester, N. Y. (Pressure atomizing)
D'Elia Oil Burner Co., Inc., Bridgeport, Conn. (Gun)
Double Duty Oil Burner Co., Inc., Rock Island, Ill. (Gun)
Easternoil, Inc., Portland, Me. (Gun)
Electrol, Inc., Clifton, N .J.
Elec-Tro-Matic Oil Burner Co., Cedarhurst, L. I., N. Y. (Gun)
Enterprise Oil Burner Co., San Francisco, Cal.
Excello Oil Heating Corp., Omaha, Nebr.
French Rotary Oil Burner Co., Sebastopol, Cal. (Gun)
●General Electric Co., Schenectady, N. Y.
General Oil Heating Corp., West New York, N. J. (Gun)
Gilbert & Barker Mfg. Co., Springfield, Mass. (Gun)
Gold Star Oil Burner Mfg. Co., Inc., Yonkers, N. Y. (Gun)
Green Foundry & Furnace Works, Des Moines, Ia. (Gun)
Grinnell Washing Machine Corp., Grinnell, Ia.
Hardinge Bros., Inc., Chicago, Ill.
Hart Oil Burner Corp., Peoria, Ill. (Gun)
Harvey-Whipple, Inc, Springfield, Mass. (Gun)
Heil Co., Milwaukee, Wis. (Gun)
Hipoint Corp., Bellefontaine, O.
Holtum Mfg. Co., Freeport, Ill. (Gun)
Home Oil Burner Corp., Hempstead, N. Y. (Gun)
Hotentot Co., Inc., Omaha, Nebr. (Gun and gravity)
Hubbard Co., Minneapolis, Minn. (Gun)
Hupp Oil Burner Co., Inc., Brooklyn, N. Y. (Gun)
Ingle Mfg. Co., San Diego, Cal. (Gravity)
Iowa Foundry Co., Sioux City, Ia.
Johnson Co., S. T., Oakland, Cal. (Rotary)
Johnson Mfg. Co., Waterloo, Ia. (Gun)
Johnston Mfg. Co., Minneapolis, Minn. (Gun)
Kais Sunrise Works, Detroit, Mich. (Gravity and rotary)
Kaybar Burner Corp., Chicago, Ill.
Kelvinator Corp., Detroit, Mich. (Gun)
Kleen Heet, Inc., Chicago, Ill. (Gun)
Laco Oil Burner Co., Griswold, Ia.
Leahy Mfg. Co., Los Angeles, Cal.
Leeson Co., T. F., Detroit, Mich. (Gun)
Little Burner Co., Inc., H. C., San Rafael, Cal. (Gravity)
Littleford Bros., Cincinnati, O.
Lynn Products Co., Lynn, Mass. (Gravity)
Mahan Oil Burner & Furnace Co., Elmhurst, Ill. (Gravity)
Malleable Iron Fittings Co., Branford, Conn. (Gun)
Mayflower Oil Burner Corp., West New York, N. J. (Gun)
May Oil Burner Corp., Baltimore, Md. (Gun)
McIlvaine Burner Corp., Chicago, Ill.
Micro Corp., Bettendorf, Ia.
Morrissey & Co., Chicago, Ill. (Gun)
Motor Wheel Corp., Lansing, Mich. (Gun)
National Airoil Burner Co., Philadelphia, Pa. (Gun)
Nelson Co., Detroit, Mich. (Gun)
Nelson Corp., Herman, Moline, Ill.
●Nu-Way Corp., Rock Island, Ill.
Oil-American Burner Corp., Roselle Park, N. J. (Rotary and gun)
●Oil Burner Builders, Inc., Rock Island, Ill. (Gun)
Pan American Engineering Corp., Ltd., Berkeley, Cal. (Gun, rotary and turbine)
Peerless Oil Burner Co., Inc., Kansas City, Mo. (Gravity)
Peoples Oil Burner Co., Chicago, Ill. Gravity)
Perfect Burner Co., Lynn, Mass. (Gun)
Perfection Stove Co., Cleveland, O.
Petroleum Heat & Power Co., Stamford, Conn. (Rotary, gravity and gun)
Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal. (Gravity)
Pressure Oil Burners, Inc., York, Pa. (Gun)
R-S Products Corp., Philadelphia, Pa. (Gun)
Ray Oil Burner Co., San Francisco, Cal. (Gun and rotary)
Reif-Rexoil, Inc., Buffalo, N. Y.
Rotary Mfg. Co., Los Angeles, Cal. (Rotary)
Scott-Newcomb, Inc., St. Louis, Mo. (Gun)
Sentry Mfg. Co., Omaha, Nebr. (Gun)
Shedlov Oil Burners, Inc., Minneapolis, Minn. (Gravity and gun)
Silent Glow Oil Burner Corp., Hartford, Conn.
Silent Sioux City Burner Corp., Orange City, Ia. (Gravity)
Simplex Oil Heating Corp., New York City (Gun and rotary)
Skinner Co., E. W., Fitchburg, Mass. (Gravity)
Summerheat Co., South Bend, Ind. (Gun)
Sundstrand Sales Co., Rockford, Ill. (Gun)
Sun-Ray Oil Burner Corp., Rockaway Park, N. Y. (Gun)
Syncro-Flame Burner Corp., Hartford, Conn. (Gun)
Timken Silent Automatic Co., Detroit, Mich. (Gun and rotary)
Todd Oil Burner & Eng. Co., New York City
Uni-Fire Co., Detroit, Mich. (Rotary)
United States Burner Corp., Hartford, Conn. (Gun and rotary)
Valley Mfg. Co., Athol, Mass. (Gun and rotary)
Victor Oil Burner Mfg. Co., Hartford, Conn. (Gravity)
Volcano Burner Corp., New York City (Gun)
Wayne Oil Burner Corp., Fort Wayne, Ind. (Gun)
Weiskittel Co., Inc., Harry C., Baltimore, Md.
Westchester Home Equipment Co., Inc., Bronx, N. Y. (Gun)
Westwick & Son, Inc., John, Galena, Ill. (Gun)
Williams Oil-O-Matic Heating Corp., Bloomington, Ill. (Gun)
●Wood Industries, Inc., Gar, Detroit, Mich. (Gun)
Woolery Machine Co., Minneapolis, Minn. (Gun)
●York Oil Burner Co., Inc., York, Pa. (Gun)

CABINET HEATERS

See Heaters, Cabinet

CAPS AND TOPS, CHIMNEY

Accurate Mfg. Works, Chicago, Ill.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Adams Co., Dubuque, Ia.
Allen Corp., Detroit, Mich.
Ames Co., W. R., San Francisco, Cal.
Biersach & Niedermeyer Company, Milwaukee, Wis.
●Chicago Metal Mfg. Co., Chicago, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Edwards Mfg. Co., Inc., Cincinnati, O.
●Excelsior Steel Furnace Co., Chicago, Ill.
●Hess-Snyder Co., Massillon, O.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Iwan Brothers, South Bend, Ind.
Lamb & Ritchie Co., Cambridge, Mass.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Neemes Foundry, Inc., Troy, N. Y.
●Providence Cornice Co., Province, R. I.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
Schoedinger Co. F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Sterling Foundry Company, Sterling, Ill. (Cast iron)
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Vail Mfg. Co, Fort Wayne, Ind.
Vermont Structural Slate Co., Fair Haven, Vt.
Watson Co., Inc., Jas. H., Bradley, Ill.

CAULKING COMPOUNDS

See Compounds, Caulking

CEILINGS, METAL

Berger Mfg. Div. of Truscon Steel Corp., Canton, O.
Brooklyn Metal Ceiling Co., Brooklyn, N. Y.
●Canton Steel Ceiling Mfg. Co., Canton, O.
Continental Steel Corp., Kokomo, Ind.
Edwards Mfg. Co., Inc., Cincinnati, O.
Friedley-Voshardt Co., Chicago, Ill.
International Steel Co., Evansville, Ind.
Klauer Mfg. Co., Dubuque, Ia.

Mesker & Co., Geo. L., Evansville, Ind.
●Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Reeves Mfg. Co., Dover, O.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger Co., F. O., Columbus, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. (Galvanized steel beaded)
Truscon Steel Co., Youngstown, O.
Watson Co., Inc., Jas. H., Bradley, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Woolwine Metal Products Co., Los Angeles, Cal.

CEMENT, ASBESTOS

Certain-teed Products Corp., New York City
Clinton Metallic Paint Co., Clinton, N. Y.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Eagle-Picher Lead Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Johns-Manville, New York City
Keasbey & Mattison Co., Ambler, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pecora Paint Co., Philadelphia, Pa.
Ruberoid Co., New York City
Rutland Fire Clay Co., Rutland, Vt.
●Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Sharpsburg, Pa. (Furnace)
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
●Tamms Silica Co., Chicago, Ill.
●Thompson & Co., Pittsburgh, Pa.
Wilhelm Co., A., Reading, Pa. (Asbestos)
Wilson, Inc., Grant, Chicago, Ill.

CEMENT, FURNACE

Acme Refining Co., Cleveland, O.
Armstrong Co., Detroit, Mich.
Barber Asphalt Co., Philadelphia, Pa.
Buckeye Products Co., Cincinnati, O.
Carey Co., Philip, Lockland, Cincinnati, O.
Clinton Metallic Paint Co., Clinton, N. Y.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, O.
Eagle-Picher Lead Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
●Fireline Stove & Furnace Lining Co., Chicago, Ill.
Hetzel Roofing Products Co., Newark, N. J.
Iowa Paint Mfg. Co., Des Moines, Ia.
Johns-Manville, New York City
Keasbey & Mattison Co., Ambler, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsburgh, Pa.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Plibrico Jointless Firebrick Co., Chicago, Ill.
●Pyrolite Products Co., Cleveland, O.
Ramtite Co., Chicago, Ill.
Ruberoid Co., New York City
Rutland Fire Clay Co., Rutland, Vt.
Sauereisen Cements Co., Sharpsburg, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
●Tamms Silica Co., Chicago, Ill.
●Walsh Refractories Corp., St. Louis, Mo.
Wilhelm Co., A., Reading, Pa.
Williamson Heater Co., Cincinnati, O.
Wilson, Inc., Grant, Chicago, Ill.

CEMENT, ROOF

Acme Refining Co., Cleveland, O. (Liquid and plastic)
All States Roofers Equipment & Material Co., Chicago, Ill.
Barrett Co., New York City
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carter Paint Co., Liberty, Ind.
Certain-teed Products Corp., New York City
Clinton Metallic Paint Co., Clinton, N. Y.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Flintkote Co., New York City
Glidden Co., Cleveland, O.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt)
Johns-Manville, New York City
Koppers Products Co., Pittsburgh, Pa.
Lastik Products Co., Inc., Pittsburgh, Pa.
National Mfg. Corp., Tonawanda, N. Y.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pecora Paint Co., Philadelphia, Pa. (Asbestos)
●Pyrolite Products Co., Cleveland, O.
Ruberoid Co., New York City
Rutland Fire Clay Co., Rutland, Vt.
●Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
United States Gypsum Co., Chicago, Ill.
Wilhelm Co., A., Reading, Pa.

CHAIN, FURNACE

American Chain Co., Inc., Bridgeport, Conn.
●Bead Chain Mfg. Co., Bridgeport, Conn.
Bridgeport Chain & Mfg. Co., Bridgeport, Conn.
Chain Products Co., Cleveland, O.
Corbin Screw Corp., New Britain, Conn.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Russell Mfg. Co., John M., Naugatuck, Conn.
Turner & Seymour Mfg. Co., Torrington, Conn.

CHANNELS

See Angles, Bars, Beams, Channels and Tees (Structural Shapes)

CLEANERS, FURNACE, VACUUM

●American Radiator Co., New York City
Arco Vacuum Corp., New York City
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Breuer Electric Mfg. Co., Chicago, Ill.
●Brillion Furnace Co., Brillion, Wis.
●Christie Cleaner Co, Cincinnati, O.
Densmore-Quinlan Co., Kenosha, Wis.
●Electric Vacuum Cleaner Co., Inc., Cleveland, O.
●Grand Rapids Furnace Cleaner Co., Grand Rapids, Mich.
Holland Furnace Co., Holland, Mich. (Truck)
Ideal Commutator Dresser Co., Sycamore, Ill.
Kent Co., Inc., Rome, N. Y.
National Super Service Co., Toledo, O.
Premier Division, Electric Vacuum Cleaner Co., Inc., Cleveland, O.
Ramey Mfg. Co., Columbus, O.
Spencer Turbine Co., Hartford, Conn.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Swift Corp., Carl E., Holland, Mich.

CLIPS, FASTENING, FOR ROOFING

American Sheet Metal Works, New Orleans, La.
Bridesburg Foundry Co., Philadelphia, Pa.
Columbia Steel Co., San Francisco, Cal.
Edwards Mfg. Co., Inc., Cincinnati, O.
●Milcor Steel Co., Milwaukee, Wis.
●Osborn Co., J. M. & L. A., Cleveland, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.

CLIPS AND TIPS, DAMPER

Adams Co., Dubuque, Ia.
●Berger Bros. Co., Philadelphia, Pa.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Griswold Mfg. Co., Erie, Pa.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Howes Co., S. M., Charlestown, Boston, Mass.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Stover Mfg. & Engine Co., Freeport, Ill.
●United States Register Co., Battle Creek, Mich.
Young Ventilating Co., Cleveland, O.

COAL BURNERS, AUTOMATIC

See Stokers

COLD AIR FACES, METAL

See Faces, Cold Air, Metal

COLD AIR FACES, WOOD

See Faces, Cold Air, Wood

COILS, COOLING, DIRECT EXPANSION

●Aerofin Corp., Newark, N. J.
Baker Ice Machine Co., Inc., Omaha, Nebr.
Bush Mfg. Co., Hartford, Conn.
Carbondale Machine Corp., Harrison, N. J.
●Clarage Fan Co., Kalamazoo, Mich.
Fedders Mfg. Co., Buffalo, N. Y.
Frick Co., Inc., Waynesboro, Pa.
Frigidaire Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
General Refrigeration Sales Co., Beloit, Wis.
Kauffman Air Conditioning Corp., St. Louis, Mo.
McCord Radiator & Mfg. Co., Detroit, Mich.
Modine Mfg. Co., Racine, Wis.
Myco Mfg. Co., Detroit, Mich.
Nesbitt, Inc., John J., Philadelphia, Pa.
Reliance Refrigeration Machine Co., Chicago, Ill.
Rempe Coil Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Servel, Inc., Evansville, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Thermal Units Mfg. Co., Chicago, Ill.
Trane Co., La Crosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric & Mfg. Co., Mansfield, O.
Wittenmeier Machinery Co., Chicago, Ill.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

COILS, COOLING, WATER

●Aerofin Corp., Newark, N. J.
American Blower Corp., Detroit, Mich.
Baker Ice Machine Co., Inc., Omaha, Nebr.
Bush Mfg. Co., Hartford, Conn.
Carbondale Machine Corp., Harrison, N. J.
●Clarage Fan Co., Kalamazoo, Mich.

Fedders Mfg. Co., Buffalo, N. Y.
Frick Co., Inc., Waynesboro, Pa.
Frigidaire Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
McCord Radiator & Mfg. Co., Detroit, Mich.
Modine Mfg. Co., Racine, Wis.
Myco Mfg. Co., Detroit, Mich.
Nesbitt, Inc., John J., Philadelphia, Pa.
Peerless Ice Machine Co., Chicago, Ill.
Reliance Refrigeration Machine Co., Chicago, Ill.
Rempe Coil Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Thermal Units Mfg. Co., Chicago, Ill.
Trane Co., La Crosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Wittenmeier Machinery Co., Chicago, Ill.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

COILS, FIRE POT, HOT WATER

●Air Controls, Inc., Cleveland, O.
●American Furnace & Foundry Co., Milan, Mich.
Devlin Mfg. Co., Thos., Burlington, N. J.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Excelso Products Corp., Buffalo, N. Y.
Globe Machinery & Supply Co., Des Moines, Ia.
Hotstream Heater Co., Cleveland, O.
●Liberty Foundry Co., St. Louis, Mo.
Kitson Co., Philadelphia, Pa.
Marshall Furnace Co., Marshall, Mich.
Melbye Bros., Inc., Chicago, Ill.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Nelson Co., Detroit, Mich.
Nugent Sons, Inc., Thos., New York City
●Rudy Furnace Co., Dowagiac, Mich.

COILS, HEATING

●Aerofin Corp., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Sales Co., Cleveland, O.
Bush Mfg. Co., Hartford, Conn.
●Clarage Fan Co., Kalamazoo, Mich.
Frigidaire Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Montag Stove & Furnace Works, Portland, Ore.
Nelson Corp., Herman, Moline, Ill.
Nesbitt, Inc., John J., Philadelphia, Pa.
Peerless Ice Machine Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Thermal Units Mfg. Co., Chicago, Ill.
Trane Co., La Crosse, Wis.
Wittenmeier Machinery Co., Chicago, Ill.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

COLLECTORS, BLOW PIPE

Airtherm Mfg. Co., St. Louis, Mo.
Bayley Blower Co., Milwaukee, Wis.
Brundage Co., Kalamazoo, Mich.
●Buffalo Forge Co., Buffalo, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
Falstrom Co., Passaic, N. J.
Garden City Fan Co., Chicago, Ill.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Goethel Co., Alfred C., Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lee & Son Co., Thomas, Cincinnati, O.
Mellish & Murray Co., Chicago, Ill.
New York Blower Co., Chicago, Ill.
Sly Mfg. Co., W. W., Cleveland, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Western Blower Co., Seattle, Wash.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Western Blower Co., Seattle, Wash.
Young & Bertke Co., Cincinnati, O.

COMBUSTION CONTROLS

See Controls, Combustion, Bonnet and Smoke Pipe

COMPOUNDS, CAULKING

Accurate Metal Weather Strip Co., New York City
Acme Refining Co., Cleveland, O.
Allmetal Weatherstrip Co., Chicago, Ill.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Clinton Metallic Paint Co., Clinton, N. Y.
Continental Products Co., Euclid, O.
Diamond Metal Weather Strip Co., Columbus.
Eagle-Picher Lead Co., Cincinnati, O.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Johns-Manville, New York City
Lastik Products Co., Inc., Pittsburgh, Pa.
Ohmlac Paint & Refining Co., Chicago, Ill.
Peccra Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
●Pyrolite Products Co., Cleveland, O.
Sauereisen Cements Co., Sharpsburg, Pa.
Thompson & Co., Pittsburgh, Pa.
Yardley Screen & Weather Strip Corp., Columbus, O.

COMPOUNDS, GLAZING

Acme Refining Co., Cleveland, O.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Diamond Metal Weather Strip Co., Columbus.
Goodrich Co., B. F., Akron, O.
Horn Co., A. C., Long Island City, N. Y.
Lastik Products Co., Inc., Pittsburgh, Pa.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
●Pyrolite Products Co., Cleveland, O.
Thompson & Co., Pittsburgh, Pa.

COMPOUNDS, TINNING

American Solder & Flux Co., Philadelphia, Pa.
Burnley Battery & Mfg. Co., North East, Pa.
Eagle-Picher Lead Co., Cincinnati, O.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.
Potomac Mfg. Co., Philadelphia, Pa.
●Ruby Chemical Co., Columbus, O.

COMPRESSORS, REFRIGERATING

Airven Co., New York City
American Engineering Co., Philadelphia, Pa.
Baker Ice Machine Co., Inc., Omaha, Nebr.
Brunner Mfg. Co., Utica, N. Y.
Carbondale Machine Corp., Harrison, N. J.
Carrier Engineering Corp., Newark, N. J.
Copeland Refrigeration Corp., Detroit, Mich.
De La Vergne Engine Co., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frick Co., Inc., Waynesboro, Pa.
Frigidaire Corp., Dayton, O.
●General Electric Co., Schenectady, N. Y.
General Refrigeration Sales Co., Beloit, Wis.
Hardy Mfg. Co., Dayton, O.
Ingersoll-Rand, New York City
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Corp., Detroit, Mich.
Merchant & Evans Co., Philadelphia, Pa.
Nash Refrigeration Co., Inc., Newark, N. J.
Norge Commercial Div. of Borg-Warner Corp., Detroit, Mich.
Reliance Refrigeration Machine Co., Chicago, Ill.
Servel, Inc., Evansville, Ind.
Uniflow Mfg. Co., Erie, Pa.
Universal Cooler Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric & Mfg. Co., Mansfield, O.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
Wittenmeier Machinery Co., Chicago, Ill.
XL Refrigerating Co., Inc., Chicago, Ill.
York Ice Machinery Corp., York, Pa.

CONDITIONERS, AIR

See Air Conditioning Units and Furnaces, Air Conditioning

CONDUCTOR FITTINGS AND ACCESSORIES

See Fittings and Acessories, Conductor

CONDUCTOR PIPE

See Pipe, Conductor

CONTROLS, COMBINED FAN AND LIMIT

Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Fulton-Syphon Co., Knoxville, Tenn.
Edison Electrical Controls Divisions, Thos. A. Edison, Inc., West Orange, N. J.
●General Electric Co., Schenectady, N. Y.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Des Moines, Ia.
Perfex Controls Co., Milwaukee, Wis.
●Russell Electric Co., Chicago, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Superstat Co., Springfield, Mass.
●White Mfg. Co., St. Paul, Minn.

CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE

Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Edison Electrical Controls Divisions, Thos. A. Edison, Inc., West Orange, N. J.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Des Moines, Ia. (Smoke-pipe)
Perfex Controls Co., Milwaukee, Wis.
●Russell Electric Co., Chicago, Ill (Combustion, smokepipe)

United Electric Controls Co., South Boston, Mass.
●White Mfg. Co., St. Paul, Minn.

CONTROLS, FAN

●Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Edison Electrical Controls Divisions, Thos. A. Edison, Inc., West Orange, N. J.
Fulton-Sylphon Co., Knoxville, Tenn.
●General Electric Co., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Paragon Electric Co., Chicago, Ill.
●Peerless Electric Co., Warren, O.
Penn Electric Switch Co., Des Moines, Ia.
Perfex Controls Co., Milwaukee, Wis.
●Russell Electric Co., Chicago, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Superstat Co., Springfield, Mass.
United Electric Controls Co., South Boston, Mass.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
●White Mfg. Co., St. Paul, Minn.

CONTROLS, HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS, PNEUMATIC

Bristol Co., Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Johnson Service Co., Milwaukee, Wis.
National Regulator Co., Chicago, Ill.
Powers Regulator Co., Chicago, Ill.

CONTROLS, LIMIT

●Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
Barber Gas Burner Co., Cleveland, O.
Bishop & Babcock Sales Co., Cleveland, O.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Edison Electrical Controls Division, Thos. A. Edison, Inc., West Orange, N. J.
General Controls Co., San Francisco, Cal., and Cleveland, O.
McCorkle Co., D. H., Berkeley, Cal.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Des Moines, Ia.
Perfex Controls Co., Milwaukee, Wis.
●Russell Electric Co., Chicago, Ill.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Co., Attleboro, Mass.
United Electric Controls Co., South Boston, Mass.
●White Mfg. Co., St. Paul, Minn.

COOLERS, ROOM, ICE, PORTABLE

●American Foundry & Furnace Co., Bloomington, Ill.
Chicago Pump Co., Chicago, Ill.
Falstrom Co., Passaic, N. J.
Ilg Electric Ventilating Co., Chicago, Ill.
Kaiser Co., H. S., Chicago, Ill.
McCormick & Co., J. H., Williamsport, Pa.
Willard Metallic Crypt Co., Willard, O.

COOLING SURFACE

See Coils, Cooling, Water

COPPER TUBING

See Tubing, Copper

COPPERS, SOLDERING

Bernz Co., Inc., Otto, Rochester, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Electric Materials Co., North East, Pa.
Electric Soldering Iron Co., Inc., New York City
Everhot Mfg. Co.. Maywood, Ill.
Gasweld & Airway, Inc., Chicago, Ill. (Acetylene)
●General Electric Co , Schenectady, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.
Peck, Stow & Wilcox Co., Southington, Conn.
●Revere Copper & Brass, Inc., New York City
Sight Feed Generator Co., Richmond, Ind.
Turner Brass Works, Sycamore, Ill.

CORNICES

American Sheet Metal Works, New Orleans, La.
●Berger Bros. Co., Philadelphia, Pa.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Brooklyn Metal Ceiling Co., Brooklyn, N. Y.
California Cornice Works, Inc., Los Angeles, Cal.
●Chicago Metal Mfg. Co., Chicago, Ill.
Danzer Metal Works, Inc., Hagerstown, Md.
Decatur Iron & Steel Co., Decatur, Ala.
Edwards Mfg. Co., Inc., Cincinnati, O.
Herrmann & Grace Co., Brooklyn, N. Y.
International Steel Co., Evansville, Ind.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Everett, Mass.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Park City Cornice Works, Inc., Bridgeport, Conn.
Perkinson & Brown, Chicago, Ill.
Philadelphia Metal Stamping Co., Camden, N. J. (Circular)
Providence Cornice Co., Providence, R. I.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
●St. Paul Corrugated Co., St. Paul, Minn.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Van Noorden Co., E., Boston, Mass.
Watson Co., Inc., Jas. H., Bradley, Ill.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

COUPLINGS, FLEXIBLE

De Laval Steam Turbine Co., Trenton, N. J.

DAMPER MOTORS

See Motors, Damper, Furnace Draft, Electrical

DAMPERS, DUCT

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
●American Foundry & Furnace Co., Bloomington, Ill.
●Berger Bros. Co., Philadelphia, Pa.
Bishop & Babcock Sales Co., Cleveland, O.
●Excelsior Steel Furnace Co., Chicago, Ill.
Howes Co., S. M., Charlestown, Boston, Mass.
Kirk & Blum Mfg. Co., Cincinnati, O.
Johnson Service Co., Milwaukee, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Myco Mfg. Co., Detroit, Mich.
Ohio Products Co., Cleveland, O.
Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Williamson Heater Co., Cincinnati, O.
Young Ventilating Co., Cleveland, O.

DAMPERS, SMOKE PIPE

Adams Co., Dubuque, Ia.
Braden Mfg. Co., Terre Haute, Ind.
●Brauer Supply Co., A. G., St. Louis, Mo.
Burt Mfg. Co., Akron, O.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Griswold Mfg. Co., Erie, Pa.
Jewett Stove & Foundry Corp., Buffalo, N. Y.
●Liberty Foundry Co., St. Louis, Mo.
Littleford Bros., Cincinnati, O.
Martin Metal Mfg. Co., Wichita, Kans.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Perfect Burner Co., Lynn, Mass.
Schoedinger, F. O., Co., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Stove Mfg. & Engine Co., Freeport, Ill.
●United States Register Co., Battle Creek, Mich.
Walker Mfg. & Sales Corp., St. Joseph, Mo.
Watson Co., Inc., Jas. H., Bradley, Ill.
Williamson Heater Co., Cincinnati, O.

DEEP WELL PUMPS

See Pumps, Deep Well

DIES AND PRESSES

See Presses and Dies

DOORS, HOLLOW METAL

American Sheet Metal Works, New Orleans, La.
Bayer Co., A. J., Los Angeles, Cal.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Edwards Mfg. Co., Inc., Cincinnati, O.
Falstrom Co., Passaic, N. J.
Herrmann & Grace Co., Brooklyn, N. Y.
Metal Door & Trim Co., La Porte, Ind.
Newman Brothers, Inc., Cincinnati, O.
Perkinson & Brown, Chicago, Ill.
●Providence Cornice Co., Providence, R. I.

DOORS, KALAMEIN

American Sheet Metal Works, New Orleans, La.
Biersach & Niedermeyer Co., Milwaukee, Wis.
California Cornice Works, Inc., Los Angeles, Cal.
Cincinnati Mfg. Co., Cincinnati, O.
Edwards Mfg. Co., Inc., Cincinnati, O.
Empire Door Co., Inc., New York City
Herrmann & Grace Co., Brooklyn, N. Y.
Mesker & Co., Geo. L., Evansville, Ind.
Newman Brothers, Inc., Cincinnati, O.
Perkinson & Brown, Chicago, Ill.
●Providence Cornice Co., Providence, R. I.
Richmond Fireproof Door Co., Syracuse, N. Y.
Syracuse Fire Door Corp., Syracuse, N. Y.
Van Noorden Co., E., Boston, Mass.
World Kalamein Sash & Door Corp., New York City

DOORS AND SHUTTERS, FIRE

American Sheet Metal Works, New Orleans, La.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.

Cornell Iron Works, Inc., Long Island City, N. Y.
Detroit Steel Products Co., Detroit, Mich.
Edwards Mfg. Co., Inc., Cincinnati, O.
Empire Door Co., Inc., New York City
Falstrom Co., Passaic, N. J.
Herrmann & Grace Co., Brooklyn, N. Y.
Kinnear Mfg. Co., Columbus, O.
Merchant & Evans Co., Philadelphia, Pa.
Mesker & Co., Geo. L., Evansville, Ind.
Perkinson & Brown, Chicago, Ill.
●Providence Cornice Co., Providence, R. I.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Richmond Fireproof Door Co., Richmond, Ind.
Saino Mfg. Co., Inc., F. L., Memphis, Tenn.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Syracuse Fire Door Corp., Syracuse, N. Y.
Van Noorden Co., E., Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.

DRAFT GAGES

See Gages, Draft

DRAFT REGULATORS

See Regulators, Furnace Draft, Mechanical

DRILLS, PORTABLE, HAND AND BENCH, ELECTRIC

Black & Decker Mfg. Co., Towson, Md.
●Buffalo Forge Co., Buffalo, N. Y. (Branch, Electric)
Champion Blower & Forge Co., Lancaster, Pa.
Clark Jr., Electric Co., Jas., Louisville, Ky.
Excelso Products Corp., Buffalo, N. Y.
Independent Pneumatic Tool Co., Chicago, Ill.
Portable Power Tool Corp., Warsaw, Ind.
Skilsaw, Inc., Chicago, Ill.
●Stanley Works, New Britain, Conn.

DUCT MOTORS

See Motors, Damper, Duct

DUCTS AND FITTINGS, PREFABRICATED

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Airtherm Mfg. Co., St. Louis, Mo.
●Chicago Metal Mfg. Co., Chicago, Ill.
●Excelsior Steel Furnace Co., Chicago, Ill.
●Henry Furnace & Foundry Co., Cleveland, O.
Howes Co., S. M., Charlestown, Boston, Mass.
●Lamneck Products, Inc., Columbus, O.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.

EAVES TROUGH FITTINGS AND ACCESSORIES

See Fittings and Accessories, Eaves Trough and Gutter

EAVES TROUGH AND GUTTERS

●American Rolling Mill Co., Middletown, O.
American Sheet Metal Works, New Orleans, La.
Ames Co., W. R., San Francisco, Cal.
Anderson Mfg. Co., Des Moines, Ia.
Barnes Metal Products Co., Chicago, Ill.
●Berger Bros., Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Bridesburg Foundry Co., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Decatur Iron & Steel Co., Decatur, Ala.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Edwards Mfg. Co., Inc., Cincinnati, O.
Heartley Machine & Tool Co., Toledo, O.
●Hussey & Co., C. G., Pittsburgh, Pa.
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Everett, Mass.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
National Lead Co., New York City
New Delphos Mfg. Co., Delphos, O.
●Newport Rolling Mill Co., Newport, Ky.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Sheet Metal Products Co., Peoria, Ill.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Tiffin Art Metal Co., Tiffin, O.
Van Noorden Co., E., Boston, Mass.
Watson Co., Inc., Jas. H., Bradley, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.
Woolwine Metal Products Co., Los Angeles, Cal.
York Corrugating Co., York, Pa.

ELBOW MACHINES

See Machines, Elbow

ELBOWS, BLOW PIPE

See Fittings, Blow Pipe

ELBOWS, CONDUCTOR

See Fittings and Accessories, Conductor

ELBOWS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

ELECTRIC DRILLS

See Drills, Portable, Hand and Bench, Electric

ELECTRIC SHEARS

See Shears, Portable, Electric

ELECTRIC WELDERS

See Welders, Arc, Spot

ELECTRICAL RELAYS

See Relays, Electrical

ELECTRODES, ARC WELDING

Air Reduction Sales Co., New York City
American Chain Co., Inc., Bridgeport, Conn.
American Steel & Wire Co., Chicago, Ill.
Central Steel & Wire Co., Chicago, Ill.
Chicago Steel & Wire Co., Chicago, Ill.
Crucible Steel Co. of America, New York City
Electric Arc Cutting & Welding Co., Newark, N. J.
●General Electric Co., Schenectady, N. Y.
Gulf States Steel Co., Birmingham, Ala.
Hollup Corp., Chicago, Ill.
Keasbey & Mattison Co., Ambler, Pa.
Lincoln Electric Co., Cleveland, O.
Linde Air Products Co., New York City
Roebling's Sons Co., John A., Trenton, N. J.
Sight Feed Generator Co., Richmond, Ind.
Torchweld Equipment Co., Chicago, Ill.
Universal Power Corp., Cleveland, O.
Welding Service Sales, Inc., San Francisco, Cal.
Westinghouse Electric & Mfg. Co., Mansfield, O.
Wilson Welder & Metals Co., Inc., North Bergen, N. J.

FACES, COLD AIR, METAL

●American Foundry & Furnace Co., Bloomington, Ill.
●Auer Register Co., Cleveland, O.
Best Register Co., Milwaukee, Wis.
Diamond Mfg. Co., Wyoming, Pa.
●Forest City Foundries Co., Cleveland, O.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hendrick Mfg. Co., Carbondale, Pa.
●Hess-Snyder Co., Massillon, O.
●Independent Register & Mfg. Co., Cleveland, O.
Keith Furnace Co., Des Moines, Ia. (Cast)
●Lamneck Products, Inc., Columbus, O.
●Liberty Foundry Co., St. Louis, Mo.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Roberts-Hamilton Co., Minneapolis, Minn.
Rock Island Register Co., Rock Island, Ill.
Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
●Waterloo Register Co., Waterloo, Ia.
Williamson Heater Co., Cincinnati, O.

FACES, COLD AIR, WOOD

American Wood Register Co., Plymouth, Ind.
Antigo Building Supply Co., Antigo, Wis.
Best Register Co., Milwaukee, Wis.
●Eaglesfield Ventilator Co., Indianapolis, Ind.
Garber Lumber & Construction Co., Strasburg, O.
Marsh Lumber Co., Dover, O.
McClure Builders' Supply Co., East Palestine, O.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
●Rock Island Register Co., Rock Island, Ill.
Tiffin Art Metal Co., Tiffin, O.
●United States Register Co., Battle Creek, Mich.
●Waterloo Register Co., Waterloo, Ia.
Wooster Art Wood, Inc., Wooster, O.

FANS, ATTIC, COMPLETE UNIT

Aerovent Fan Co., Piqua, O.
●Air Controls Inc., Cleveland, O.
Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
Arcweld Mfg. Co., Seattle, Wash.
●Autovent Fan & Blower Co., Chicago, Ill.
Bishop & Babcock Sales Co., Cleveland, O.
●Buffalo Forge Co., Buffalo, N. Y.
Electrovent Fan & Mfg. Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
●General Regulator Corp., Chicago, Ill.
●International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
●Lau Heating Service, Inc., Dayton, O.

Meier Electric & Machine Co., Indianapolis, Ind.
Mellish & Murray Co., Chicago, Ill.
New York Blower Co., Chicago, Ill.
●Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.
●Russell Electric Co., Chicago, Ill.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Universal Blower Co., Birmingham, Mich.
●Victor Electric Products, Inc., Cincinnati, O.

FANS, BOOSTER

A-C Mfg. Co., Inc., Pontiac, Ill.
Advance Aluminum Castings Corp., Chicago, Ill.
Aerovent Fan Co., Piqua, O.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
●American Foundry & Furnace Co., Bloomington, Ill.
Arcweld Mfg. Co., Seattle, Wash.
●Autovent Fan & Blower Co., Chicago, Ill.
●Buffalo Forge Co., Buffalo, N. Y.
Cary Mfg. Co., Waupaca, Wis.
De Bothezat Corp., New York City
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
Evans Corp., George, Moline, Ill.
●Forct-Air Co., Rockford, Ill.
Forest Specialty Co., Chicago, Ill.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
●General Regulator Corp., Chicago, Ill.
●International Engineering, Inc., Dayton, O.
Johnston Co., Wm. W., Dayton, O.
Meier Electric & Machine Co., Indianapolis, Ind.
●Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.
Roan Mfg. Co., Racine, Wis.
●Rock Island Register Co., Rock Island, Ill.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Universal Blower Co., Birmingham, Mich.
●Victor Electric Products, Inc., Cincinnati, O.
Western Blower Co., Seattle, Wash.

FANS, FURNACE, PROPELLER TYPE

Aerovent Fan Co., Piqua, O.
●Air Controls, Inc., Cleveland, O.
American Coolair Corp., Jacksonville, Fla.
●American Foundry & Furnace Co., Bloomington, Ill.
Arcweld Mfg. Co., Seattle, Wash.
●Autovent Fan & Blower Co., Chicago, Ill.
●Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
●Campbell Heating Co., E. K., Kansas City, Mo.
Columbus Heating & Ventilating Co., Columbus, O.
Coppus Engineering Corp., Worcester, Mass.
De Bothezat Corp., New York City.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
●Forct-Air Co., Rockford, Ill.
Fraser Furnace Co., Inc., Stockton, Cal.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
●General Regulator Corp., Chicago, Ill.
Haynes Furnace Fan Co., Kansas City, Mo.
●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
●International Engineering, Inc., Dayton, O.
Johnston Co., Wm. W., Dayton, O.
●Lennox Furnace Co., Marshalltown, Ia.
McPherson Furnace & Supply Co., Portland, Ore.
Meier Electric & Machine Co., Indianapolis, Ind.
New York Blower Co., Chicago, Ill.
●Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.
●Russell Electric Co., Chicago, Ill.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Universal Blower Co., Birmingham, Mich.
●Victor Electric Products, Inc., Cincinnati, O.
Western Blower Co., Seattle, Wash.
Wing Mfg. Co., L. J., New York City.

FANS, KITCHEN EXHAUST

Aerovent Fan Co., Piqua, O.
Airmaster Corp., Chicago, Ill.
Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
Arcweld Mfg. Co., Seattle, Wash.
●Autovent Fan & Blower Co., Chicago, Ill.
Barrett Regulation Engineers Co., Cleveland Heights, O.
Bishop & Babcock Sales Co., Cleveland, O.
●Buffalo Forge Co., Buffalo, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
De Bothezat Corp., New York City.
Delco Appliance Corp., Rochester, N. Y.
Diehl Mfg. Co., Elizabethport, N. J.
Electrovent Corp., Detroit, Mich.
Elevtrovent Fan & Mfg. Co., Chicago, Ill.
Economy Electric Mfg. Co., Cicero, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
●Forct-Air Co., Rockford, Ill.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
●General Electric Co., Schenectady, N. Y.
●General Regulator Corp., Chicago, Ill.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Holtum Mfg. Co., Freeport, Ill.
●International Engineering, Inc., Dayton, O.
●Jordan & Co., Paul R., Indianapolis, Ind.
Meier Electric & Machine Co., Indianapolis, Ind.
Midwest Ventilating Works, Milwaukee, Wis.
Myers Electric Co., Pittsburgh, Pa.
Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.
●Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.
Pryne & Co., Inc., Los Angeles, Cal.
Reed Unit-Fans, Inc., New Orleans, La.
Stover Mfg. & Engine Co., Freeport, Ill.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Universal Blower Co., Birmingham, Mich.
●Victor Electric Products, Inc., Cincinnati, O.
Wagner Electric Corp., St. Louis, Mo.
Ward Mfg. Co., Detroit, Mich.
Western Blower Co., Seattle, Wash.
Westinghouse Electric & Mfg. Co., Mansfield, O.

FANS, VENTILATING, PROPELLER TYPE

(Capacity 4,000 c.f.m. up)

Aerovent Fan Co., Piqua, O.
Airmaster Corp., Chicago, Ill.
Allen Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
American Blower Corp., Detroit, Mich.
Ames Co., W. R., San Francisco, Cal.
Arcweld Mfg. Co., Seattle, Wash.
●Autovent Fan & Blower Co., Chicago, Ill.
Bayley Blower Co., Milwaukee, Wis.
Binks Mfg. Co., Chicago, Ill.
Bishop & Babcock Sales Co., Cleveland, O.
●Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
●Campbell Heating Co., E. K., Kansas City, Mo.
Century Electric Co., St. Louis, Mo.
●Clarage Fan Co., Kalamazoo, Mich.
Clay Equipment Corp., Cedar Falls, Ia.
Columbus Heating & Ventilating Co., Columbus, O.
Coppus Engineering Corp., Worcester, Mass.
De Bothezat Corp., New York City.
Diehl Mfg. Co., Elizabethport, N. J.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
Evry-Use Products, Inc., New York City.
●Forct-Air Co., Rockford, Ill.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
●General Electric Co., Schenectady, N. Y.
●General Regulator Corp., Chicago, Ill.
Hartzell Propeller Fan Co., Piqua, O.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Hudson Equipment Corp., Minneapolis, Minn.
●International Engineering, Inc., Dayton, O.
Johnson Fan & Blower Corp., Chicago, Ill.
Johnston & Co., Wm. W., Dayton, O.
●Jordan & Co., Paul R., Indianapolis, Ind.
King Ventilating Co., Owatonna, Minn.
●Lau Heating Service, Inc., Dayton, O.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Meier Electric & Machine Co., Indianapolis, Ind.
Myers Electric Co., Pittsburgh, Pa.
National Fan & Blower Corp., Chicago, Ill.
Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.
●Peerless Electric Co., Warren, O.
Perkins & Son, Inc., B. F., Holyoke, Mass.
Propellair, Inc., Springfield, O.
●Russell Electric Co., Chicago, Ill.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Star Electric Motor Co., Bloomfield, N. J.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
●Victor Electric Products, Inc., Cincinnati, O.
Western Blower Co., Seattle, Wash.
Western Rotary Ventilator Co., Inc., Los Angeles, Cal.
Wing Mfg. Co., L. J., New York City.

FAN (PROPELLER)—FILTER UNITS

●Air Controls, Inc., Cleveland, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
●Henry Furnace & Foundry Co., Cleveland, O.
●International Engineering, Inc., Dayton, O.
●Osborn Co., J. M. & L. A., Cleveland, O.
●Russell Electric Co., Chicago, Ill.

FILTERS, AIR

●American Air Filter Co., Inc., Louisville, Ky.
●American Foundry & Furnace Co., Bloomington, Ill.
●American Radiator Co., New York City.
Burt Air Filter Corp., New York City.
Consolidated Air Conditioning Corp., New York City.
Coppus Engineering Corp., Worcester, Mass.
Davies Air Filter Corp., New York City.
Gehri Co., Tacoma, Wash.
Greene Gas Cleaner Co., Cleveland, O.
Hugo Mfg. Co., Duluth, Minn.

Independent Air Filter Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kleenaire Corp., Stevens Point, Wis.
Michigan Wire Cloth Co., Detroit, Mich.
●Owens-Illinois Glass Co., Newark, O.
Plymouth Cordage Co., North Plymouth, Mass.
Ripley Co., W. R., Tacoma, Wash.
●Russell Electric Co., Chicago, Ill.
Somers Air Filter Sales Co., Detroit, Mich.
Somers, Inc., H. J., Detroit, Mich. (Hair Glass).
Staynew Filter Corp., Rochester, N. Y.
Tuttle Air Filter Co., Inc., Louisville, Ky.
●Wilson & Co., Inc., Chicago, Ill.
Wilson, Inc., Grant, Chicago, Ill. (Hair)

FILTERS, MATERIAL

See Bags, Fume and Filter

FIRE BRICK

See Refractories

FITTINGS AND ACCESSORIES, CONDUCTOR

(Elbows, Heads, Hooks, Shoes, Straps, etc.)

Barnes Metal Products Co., Chicago, Ill.
●Berger Bros. Co., Philadelphia, Pa.
Berger Co., L. D., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Champion Furnace Pipe Co., Peoria, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co. Cincinnati, O.
Crary Mfg. Co., Middleport, O. (Cut-off.)
Danzer Metal Works, Inc., Hagerstown, Md.
Dieckmann Co., Ferdinand, Cincinnati, O.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Edwards Mfg. Co., Inc., Cincinnati, O.
Heartley Machine & Tool Co., Toledo, O.
●Hussey & Co., C. G., Pittsburgh, Pa.
Iwan Bros., South Bend, Ind.
Jelliff Mfg. Corp., C. O., Southport, Conn.
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Levow, David, New York City.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
New Delphos Mfg. Co., Delphos, O.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Philadelphia Metal Stamping Co., Camden, N. J.
●Providence Cornice Co., Providence, R. I.
Royal Metal Products Co., Brooklyn, N. Y.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, Co., F. O., Columbus, O.
Sheet Metal Products Co., Peoria, Ill.
Stewart Foundry, O. S., Cleveland, O.
Tiffin Art Metal Co., Tiffin, O.
Wall Mfg. Supply Co., P., Pittsburgh, Pa.
Watson Co., Inc., Jas. H., Bradley, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.
Woolwine Metal Products Co., Los Angeles, Cal.

FITTINGS AND ACCESSORIES, EAVES TROUGH AND GUTTER

(Hangers, Strainers, Miters, Ends, Thimbles, etc.)

Abbott Mfg. Co., Painesville, O. (Hangers)
●American Rolling Mill Co., Middletown, O.
Barnes Metal Products Co., Chicago, Ill.
●Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
California Cornice Works, Inc., Los Angeles, Cal.
●Chicago Metal Mfg. Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Edwards Mfg. Co., Inc., Cincinnati, O.
Grand Rapids Wire Products Co., Grand Rapids, Mich.
Heartley Machine & Tool Co., Toledo, O.
●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
Iwan Brothers, South Bend, Ind.
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Everett, Mass.
Levow, David, New York City
Lyman Co., H. B. Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
New Delphos Mfg. Co., Delphos, O.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Ohio Wire Products Co., Dover, O. (Hangers)
●Osborn Co., J. M. & L. A., Cleveland, O.
●Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
St. Paul Corrugating Co., St. Paul, Minn.
Sheet Metal Products Co., Peoria, Ill.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Tiffin Art Metal Co., Tiffin, O.
Waddell, Bruce, Indianapolis, Ind.
Watson Co., Inc., Jas. H., Bradley, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.
Woolwine Metal Products Co., Los Angeles, Cal.

FITTINGS AND ACCESSORIES, FURNACE PIPE

(Angles, Boots, Elbows, Heads, Joints, Offsets, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Airven Co., New York City
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bergstrom Mfg. Co., Neenah, Wis.
Braden Mfg. Co., Terre Haute, Ind.
Campbell Heating Co., Des Moines, Ia.
Cary Mfg. Co., Waupaca, Wis.
Champion Furnace Pipe Co., Peoria, Ill.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
●Excelsior Steel Furnace Co., Chicago, Ill.
●Henry Furnace & Foundry Co., Cleveland, O.
Holland Furnace Co., Holland, Mich.
Home Furnace Co., Holland, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis. (Elbows and pipe only)
●Lamneck Products, Inc., Columbus, O.
Lyman Co., H. B., Southampton, Mass.
Majestic Co., Huntington, Ind.
Marshall Furnace Co., Marshall, Mich.
Martin Bros., Rochester, N. Y.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
●Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rock Island Register Co., Rock Island, Ill.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Sterling Foundry Co., Sterling, Ill. (Cast Iron)
Tiffin Art Metal Co., Tiffin, O.
Tuttle & Bailey, Inc., New Britain, Conn. (Turning Blades)
●United States Register Co., Battle Creek, Mich.
Wheeling Corrugating Co., Wheeling, W. Va.
Williamson Heater Co., Cincinnati, O.

FITTINGS AND ACCESSORIES, SMOKE PIPE

(Draw-bands, Clean-outs, Collars, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Airven Co., New York City
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Berger Co., L. D., Philadelphia, Pa.
Bergstrom Mfg. Co., Neenah, Wis.
Braden Mfg. Co., Terre Haute, Ind.
●Brauer Supply Co., A. G., St. Louis, Mo.
Cary Mfg. Co., Waupaca, Wis.
Champion Furnace Pipe Co., Peoria, Ill.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
●Excelsior Steel Furnace Co., Chicago, Ill.
Harold Furnace Mfg. Co., Spokane, Wash.
●Hart & Cooley Mfg. Co., Chicago, Ill. (Lugs)
●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
●Lamneck Products, Inc., Columbus, O.
Lyman Co., H. B., Southampton, Mass.
Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Patten Co., J. V., Sycamore, Ill.
●Peerless Foundry Co., Indianapolis, Ind.
●Providence Cornice Co., Providence, R. I.

Reeves Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rock Island Register Co., Rock Island, Ill.
Schoedinger, F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Standard Furnace & Supply Co., Omaha, Nebr.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Art Metal Co., Tiffin, O.
●United States Register Co., Battle Creek, Mich.
Watson Co., Inc., Jas. H., Bradley, Ill.
Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co, Akron, O.

FITTINGS AND ACCESSORIES, STOVE PIPE

(Draw-bands, Collars, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Berger Co., L. D., Philadelphia, Pa.
Champion Furnace Pipe Co., Peoria, Ill.
●Chicago Metal Mfg. Co., Chicago, Ill.
●Excelsior Steel Furnace Co., Chicago, Ill.
Howes Co., S. M., Charlestown, Boston, Mass.
●Milcor Steel Co., Milwaukee, Wis.
●Osborn Co., J. M. & L. A., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
●Peerless Foundry Co., Indianapolis, Ind.
●Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
Schoedinger, F. O., Co., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
●United States Register Co., Battle Creek, Mich.
Walker Mfg. & Sales Corp., St. Joseph, Mo. (Tees).
Wheeling Corrugating Co., Wheeling, W. Va.

FITTINGS, BLOW PIPE

(Elbows, Flanges, Hangers, Hoods and Sweeps, Joints, Rings, Tubing)

Acer & Whedon, Inc., Medina, N. Y.
Airtherm Mfg. Co., St. Louis, Mo.
●Chicago Metal Mfg. Co., Chicago, Ill.
Danzer Metal Works, Inc., Hagerstown, Md.
Falstrom Co., Passaic, N. J.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Goethel Co., Alfred C., Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lee & Son Co., Thomas, Cincinnati, O.
●Milcor Steel Co., Milwaukee, Wis.
●Providence Cornice Co. Providence R. I.
Southbridge Roofing Co. Inc. Southbridge Mass.
●United States Register Co. Battle Creek, Mich.
Western Blower Co., Seattle, Wash.
Young & Bertke Co., Cincinnati, O.

FITTINGS, HUMIDIFIER, WATER LINE

●American Brass Co., Waterbury, Conn.
Bishop Humidifier Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
●Detroit Lubricator Co., Detroit, Mich.
Fisher Governor Co., Marshalltown, Ia.
Hays Mfg. Co., Erie, Pa.
Holland Furnace Co., Holland, Mich.
Humidity Headquarters, Cleveland, O.
Kleenaire Corp., Stevens Point, Wis.
Lewis Air Conditioners, Inc., Minneapolis, Minn.
●Maid-O'-Mist, Inc., Chicago, Ill.
McDonnell & Miller, Chicago, Ill.
Perfex Controls Co., Milwaukee, Wis.
Reichert Float & Mfg. Co., Toledo, O.
●Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
Skuttle Co., J. L., Detroit, Mich.
Turney Corp., Muskegon, Mich.

FLANGES, BLOW PIPE

See Fittings, Blow Pipe

FLASHINGS, ROOF

●American Brass Co., Waterbury, Conn.
●American Rolling Mill Co., Middletown, O.
Ames Co., W. R., San Francisco, Cal.
Barrett Co., New York City.
Bridesburg Foundry Co., Philadelphia, Pa.
California Cornice Works, Inc., Los Angeles, Cal.
Chase Brass & Copper Co., Waterbury, Conn.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Eagle-Picher Lead Co., Cincinnati, O.
Edwards Mfg. Co., Inc., Cincinnati, O.
Figge Co., Chicago, Ill.
Herrmann & Grace Co., Brooklyn, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Koppers Products Co., Pittsburgh, Pa.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Everett, Mass.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
New Delphos Mfg. Co., Delphos, O.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Penn Ventilating Co., Philadelphia, Pa.
●Providence Cornice Co., Providence, R. I.
●Revere Copper & Brass, Inc., New York City.
Robertson Co., H. H., Pittsburgh, Pa.
Rochester Lead Works, Inc., Rochester, N. Y.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
Schoedinger, Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Art Metal Co., Tiffin, O.
Van Noorden Co., E., Boston, Mass.
Weirton Steel Co., Weirton, W. Va.
York Corrugating Co., York, Pa.

FLASHINGS, THROUGH-WALL

●American Brass Co., Waterbury, Conn. (Copper).
●American Rolling Mill Co., Middletown, O. (Armco Ingot Iron).
Cheney Co., Winchester, Mass. (Copper).
Fingles, Inc., W. A., Baltimore, Md.
Koppers Products Co., Pittsburgh, Pa. (Composition).
Southbridge Roofing Co. Inc. Southbridge Mass. (Copper & Galvanized)
●Revere Copper & Brass Inc., New York City. (Copper)
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. (Galvanized Steel)

FLASHINGS, WALL

●American Rolling Mill Co., Middletown, O.
Cheney Co., Philadelphia, Pa.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Figge Co. Chicago, Ill.
Fingles, Inc., W. A., Baltimore, Md.
Herrmann & Grace Co., Brooklyn, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
●Milcor Steel Co., Milwaukee Wis.
New Delphos Mfg. Co., Delphos, O.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Providence Cornice Co., Providence, R. I.
●Revere Copper & Brass, Inc., New York City.
Robertson Co., H. H. Pittsburgh, Pa.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Tennessee Coal, Iron & Railroad Co. Birmingham, Ala.
Tiffin Art Metal Co., Tiffin, O.
York Corrugating Co., York, Pa.

FLUX, SOLDERING

Alumaweld Co. of America, Chicago, Ill.
●American Brass Co., Waterbury Conn.
American Solder & Flux Co. Philadelphia, Pa.
●Benson Co., Inc., Alex. R., Hudson, N. Y. (Salts, Pastes)
Burnley Battery & Mfg. Co., North East, Pa.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Gardiner Metal Co., Chicago, Ill.
●General Electric Co., Schenectady, N. Y.
Handy & Harmon, New York City
Imperial Brass Mfg. Co., Chicago, Ill.
Ke-Ti Products Co., Columbus, O.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
Milburn Co., Alexander, Baltimore, Md.
Pfanstiehl Chemical Co., Waukegan, Ill.
Potomac Mfg. Co., Philadelphia, Pa.
●Ruby Chemical Co., Columbus, O. (Liquid and Paste)
Sight Feed Generator Co., Richmond, Ind.
Torchweld Equipment Co., Chicago, Ill.

FORCED DRAFT BLOWERS

See Blowers, Forced Draft

FURNACE BLOWERS

See Blowers, Furnace, Centrifugal

FURNACE CEMENT

See Cement, Furnace

FURNACE CHAIN

See Chain, Furnace

FURNACE COVERING

See Insulation, Furnace and Pipe

FURNACE FANS

See Fans, Furnace, Propeller Type

FURNACE FILTERS

See Filters, Air

FURNACE HUMIDIFIERS

See Humidifiers, Furnace, Evaporation and Spray

FURNACE INSULATION

See Insulation, Furnace and Pipe

FURNACE LINING

See Refractories

FURNACE PIPE

See Pipe, Furnace

FURNACE PIPE FITTINGS AND ACCESSORIES

See Fittings and Accessories, Furnace Pipe

FURNACE PULLEYS

See Pulleys, Furnace

FURNACE REGULATORS

See Regulators, Furnace Draft, Mechanical and Motors, Damper, Furnace Draft, Electrical

FURNACE REPAIRS

See Repairs, Stove and Furnace

FURNACE VACUUM CLEANERS

See Cleaners, Furnace, Vacuum

FURNACES, AIR CONDITIONING

(Matched furnace-fan-filter-humidifier unit)

Aladdin Heating Corp., Oakland, Cal. (Gas)
●American Foundry & Furnace Co., Bloomington, Ill. (Coal, gas or oil)
American Furnace Co., St. Louis, Mo.
American Gas Appliance Co., Chicago, Ill.
Ames Co., W. R., San Francisco, Cal. (Gas or oil)
●Armstrong Furnace Co., Columbus, O.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Baker Furnace & Cleaner Mfg. Co., Toledo, O. (Coal, gas or oil)
Beck Engineering Combustion Kompany, St. Louis, Mo.
Brown Sheet Iron & Steel Co., St. Paul, Minn. (Coal)
Bryan Plumbing & Heating Co., Bryan, O. (Oil)
Bryant Corp., C. L., Cleveland, O. (Gas)
Bryant Heater Co., Cleveland, O.
Campbell Heating Co., Des Moines, Ia. (Coal, gas or oil)
●Campbell Heating Co., E. K., Kansas City, Mo. (Coal, gas or oil)
Carrier Engineering Corp., Newark, N. J. (Gas)
Century Engineering Corp., Cedar Rapids, Ia. (Oil)
●Chandler Co., Cedar Rapids, Ia. (Coal, gas or oil)
Columbus Heating & Ventilating Co., Columbus, O. (Coal)
●Dail Steel Products Co., Lansing, Mich. (Coal, gas or oil)
Delco Appliance Corp., Rochester, N. Y. (Gas or oil)
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Economy Baler Co., Ann Arbor, Mich.
Edwards Mfg. Co., Inc., Cincinnati, O. (Gas or oil)
Electrogas Furnace & Mfg. Co., San Francisco, Cal.
Electrol, Inc., Clifton, N. J. (Oil)
Enterprise Boiler & Tank Works, Inc., Chicago, Ill.
Evans Corp., George, Moline, Ill. (Gas or oil)
●Forest City Foundries Co., Cleveland, O. (Coal, gas or oil)
●Fox Furnace Co., Elyria, O. (Coal, gas or oil)
Gilbert & Barker Mfg. Co., Springfield, Mass.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind. (Coal or oil)
●Henry Furnace & Foundry Co., Cleveland, O.
●Hess Warming & Ventilating Co., Chicago, Ill.
Holland Furnace Co., Holland, Mich. (Coal)
●"Home Comfort" Furnace & Mfg. Co., St. Louis, Mo. (Coal, gas or oil)
Hotentot Co., Inc., Omaha, Nebr. (Gas or oil)
International Heater Co., Utica, N. Y. (Coal, gas or oil)
●Joliet Heating Corp., Joliet, Ill.
Keith Furnace Co., Des Moines, Ia. (Coal or oil)
Kelsey Heating Co., Syracuse, N. Y.
Leeson Co., T. F., Detroit, Mich. (Oil)
●Lennox Furnace Co., Marshalltown, Ia.
Lewis Air Conditioners, Inc., Minneapolis, Minn. (Oil)
●Liberty Foundry Co., St. Louis, Mo. (Coal)
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O. (Coal)
●Meyer Furnace Co., Peoria, Ill. (Coal, gas or oil)
Montag Stove & Furnace Works, Portland, Ore. (Coal, oil or wood)
Motor Wheel Corp., Lansing, Mich. (Oil)
●Mueller Furnace Co., L. J., Milwaukee, Wis. (Coal, gas or oil)
Nelson Co., Detroit, Mich. (Coal, gas or oil)
Nelson Corp., Herman, Moline, Ill. (Coal or oil)
●Oil Burner Builders, Inc., Rock Island, Ill. (Oil)
●Pacific Gas Radiator Co., Huntington Park, Cal. (Gas)
●Payne Furnace & Supply Co., Beverly Hills, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
Perfect Burner Co., Lynn, Mass. (Oil)
Pennsylvania Engineering Works, New Castle, Pa.
Perfection Stove Co., Cleveland, O.
Phillips Heating Ventilating & Mfg. Co., Los Angeles, Cal.
Premier Furnace Co., Dowagiac, Mich.
●Richardson & Boynton Co., New York City. (Coal or oil)
Robinson Furnace Co., Chicago, Ill.
Robinson Heating & Ventilating Corp., Massillon, O. (Coal or gas)
Rock Island Stove Co., Rock Island, Ill. (Coal, gas or oil)
●Round Oak Co., Dowagiac, Mich.
●Rudy Furnace Co., Dowagiac, Mich. (Coal, gas or oil)
●Rybolt Heater Co., Ashland, O. (Coal or oil)
Security Stove & Mfg. Co., Kansas City, Mo. (Coal or gas)
Standard Furnace & Supply Co., Omaha, Nebr. (Gas)
Surface Combustion Corp., Toledo, O. (Gas)
Thatcher Co., Newark, N. J.
Timken Silent Automatic Co., Detroit, Mich.
Trane Co., La Crosse, Wis.
●Twentieth Century Heating & Ventilating Co., Akron, O.
●Waterman-Waterbury Co., Minneapolis, Minn. (Coal, gas or oil)
Wayne Oil Burner Corp., Fort Wayne, Ind.
Williamson Heater Co., Cincinnati, O. (Coal)
●Wise Furnace Co., Akron, O. (Coal)
●Wood Industries, Inc., Gar, Detroit, Mich. (Oil)
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, FLOOR

Aladdin Heating Corp., Oakland, Cal.
Andes Range & Furnace Corp., Geneva, N. Y.
●Armstrong Furnace Co., Columbus, O.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Cocking, Geo. J., Santa Ana, Cal.
Coleman Lamp & Stove Co., Wichita, Kan.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Electrogas Furnace & Mfg. Co., San Francisco, Cal.
Enterprise Foundry Co., Belleville, Ill.
Estate Stove Co., Hamilton, O. (Gas)
●Excelsior Steel Furnace Co., Chicago, Ill.
Falco Furnace Co., San Francisco, Cal.
Foss Heating & Engineering Co., Pasadena, Cal.
●Fox Furnace Co., Elyria, O.
Fraser Furnace Co., Stockton, Cal.
Gem City Stove Co., Dayton, O.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Henry Furnace & Foundry Co., Cleveland, O.
Holland Furnace Co., Holland, Mich.
Johnston Gas Furnace Corp., Los Angeles, Cal.
Koons Furnace Co., Danville, Ill.
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil burning)
Marshall Furnace Co., Marshall, Mich.
Miller Floor Furnace Co., Oakland, Cal.
Milwaukee Welded Steel Corp., Milwaukee, Wis.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Rock Island Stove Co., Rock Island, Ill.
●Rudy Furnace Co., Dowagiac, Mich.
Security Stove & Mfg. Co., Kansas City, Mo. (Gas)
Ward Heater Co., Ltd., Los Angeles, Cal.

FURNACES, SOLDERING

Bernz Co., Inc., Otto, Rochester, N. Y.
Burgess Soldering Furnace Co., Columbus, O. (Gasoline)
Clayton & Lambert Mfg. Co., Detroit, Mich.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Estate Stove Co., Hamilton, O.
Hones, Inc., Charles A., Baldwin, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Liquefied Gas Appliance Co., Mars, Pa.
Red Devil Mfg. Co., Palatine, Ill.
Roper Corp., Geo. D., Rockford, Ill.
Turner Brass Works, Sycamore, Ill.
Wall Mfg. Supply Co., P., Pittsburgh, Pa.

FURNACES, WARM AIR, COAL BURNING, CAST IRON

Agricola Furnace Co., Inc., Gadsden, Ala.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
Andes Range & Furnace Corp., Geneva, N. Y.
Barry Furnace Co., Hamilton, O.
Bergstrom Mfg. Co., Neenah, Wis.
●Brillion Furnace Co., Brillion, Wis.
●Chandler Co., Cedar Rapids, Ia.
Cleveland Co-Operative Stove Co., Cleveland, O.
Columbus Heating & Ventilating Co., Columbus, O.
Danville Stove & Mfg. Co., Danville, Pa.
Dayton Casting Co., Dayton, O.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Edwards Furnace Co., Wellsboro, Pa.
Emrich Co., C., Columbus, O.
Enterprise Boiler & Tank Works, Inc., Chicago, Ill.
Enterprise Foundry Co., Belleville, Ill.
●Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Farris Furnace Co., Springfield, Ill.
Faultless Heater Corp., Cleveland, O.
Favorite Mfg. Co., Piqua, O.
Floral City Co., Monroe, Mich.
Floyd-Wells Co., Royersford, Pa.
Foote Foundry Co., J. B., Fredericktown, O.
●Forest City Foundries Co., Cleveland, O.
●Fox Furnace Co., Elyria, O.
Fuller-Warren Co., Milwaukee, Wis.
Gem City Stove Co., Dayton, O.
Germer Stove Co., Erie, Pa.
Green Foundry & Furnace Works, Des Moines, Ia.

Hall-Neal Furnace Co., Indianapolis, Ind.
Harold Furnace Mfg. Co., Spokane, Wash.
Hart & Crouse Co., Inc., Utica, N. Y.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland, O.
●Hess-Snyder Co., Massillon, O.
Holland Furnace Co., Holland, Mich.
●"Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Home Furnace Co., Holland, Mich.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit, Mich.
Independence Stove & Furnace Co., Independence, Mo.
International Heater Co., Utica, N. Y.
Iowa Foundry Co., Sioux City, Ia.
Kansas City Furnace Co., Kansas City, Mo.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
Klein Stove Co., Philadelphia, Pa.
●Liberty Foundry Co., St. Louis, Mo.
McPherson Furnace & Supply Co., Portland, Ore.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O.
●Meyer Furnace Co., Peoria, Ill.
Miller Range & Furnace Co., Wm., Cincinnati, O.
Montag Stove & Furnace Works, Portland, Ore.
Moore Corp., Joliet, Ill.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
●Oakland Foundry Co., Belleville, Ill.
Orbon Stove Co., Belleville, Ill.
●Osborn Co., J. M. & L. A., Cleveland, O.
●Peerless Foundry Co., Indianapolis, Ind.
Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.
●Pittston Stove Co., Pittston, Pa.
Premier Furnace Co., Dowagiac, Mich.
●Richardson & Boynton Co., New York City
Robinson Furnace Co., Chicago, Ill.
●Rock Island Stove Co., Rock Island, Ill.
●Round Oak Co., Dowagiac, Mich.
●Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
St. Clair Foundry Corp., Centralia, Ill.
Schill Mfg. Co., Crestline, O.
Schwab Gilt Edge Furnace & Mfg. Co., Cedar Grove, Wis.
Security Stove & Mfg. Co., Kansas City, Mo.
Spear Stove & Heating Co., James, Philadelphia, Pa.
●Standard Foundry & Furnace Co., De Kalb, Ill.
Standard Furnace & Supply Co., Omaha, Nebr.
Stratton & Terstegge Co., Louisville, Ky.
Thatcher Co., Newark, N. J.
●Twentieth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit, Mich.
Walker & Pratt Mfg. Co., Boston, Mass.
Washington Stove Works, Everett, Wash.
Western Furnaces, Inc., Tacoma, Wash.
Westwick & Son, Inc., John, Galena, Ill.
Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, COAL BURNING, STEEL

●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich. (Combination Cast Iron & Steel)
Arcweld Mfg. Co., Seattle, Wash.
●Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Brown Sheet Iron & Steel Co., St. Paul, Minn.
Campbell Heating Co., Des Moines, Ia.
●Campbell Heating Co., E. K., Kansas City, Mo.
Cary Mfg. Co., Waupaca, Wis.
Cole Hot Blast Mfg. Co., Chicago, Ill.
●Dail Steel Products Co., Lansing, Mich.
Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
Deshler Foundry & Mach. Wks., Deshler, O.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Enterprise Boiler & Tank Works, Inc., Chicago, Ill.
●Excelsior Steel Furnace Co., Chicago, Ill.
Farquhar Furnace Co., Wilmington, O.
Faultless Heater Corp., Cleveland, O.
Floral City Co., Monroe, Mich.
●Forest City Foundries Co., Cleveland, O.
●Fox Furnace Co., Elyria, O.
Gehri Co., Tacoma, Wash.
Hall-Neal Furnace Co., Indianapolis, Ind.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland, O.
●Hess-Snyder Co., Massillon, O.
●Hess Warming & Ventilating Co., Chicago, Ill.
●"Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit, Mich.
International Heater Co., Utica, N. Y.
Iowa Foundry Co., Sioux City, Ia.
●Joliet Heating Corp., Joliet, Ill.
Koons Furnace Co., Danville, Ill.
Kruse & Dewenter Co., Indianapolis, Ind.
Lee Heating Systems, Youngstown, O.
●Lennox Furnace Co., Marshalltown, Ia.
●Liberty Foundry Co., St. Louis, Mo.
Lookout Furnace Co., Chattanooga, Tenn.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Majestic Furnace Co., Seattle, Wash.
Marshall Furnace Co., Marshall, Mich.
●Meyer Furnace Co., Peoria, Ill.
Milwaukee Welded Steel Corp., Milwaukee, Wis.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Nelson Co., Detroit, Mich.
Nugent Sons, Inc., Thos., New York City
Patten Co., J. V., Sycamore, Ill.
●Peerless Foundry Co., Indianapolis, Ind.
Pennsylvania Engineering Works, New Castle, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Perfect Burner Co., Lynn, Mass.
Premier Furnace Co., Dowagiac, Mich.
Quist Furnace & Mfg. Co., Milwaukee, Wis.
Ramey Mfg. Co., Columbus, O.
Ribside Furnace Co., Wausau, Wis.
●Richardson & Boynton Co., New York City
Roberts-Hamilton Co., Minneapolis, Minn.
Robinson Heating & Ventilating Corp., Massillon, O.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
Schill Mfg. Co., Crestline, O.
Schwab Gilt Edge Furnace & Mfg. Co., Cedar Grove, Wis.
Smuck-Thiele Co., Indianapolis, Ind.
Stratton & Terstegge Co., Louisville, Ky.
Thatcher Co., Newark, N. J.
●Thompson Mfg. Co., Denver, Colo.
●Twentieth Century Heating & Ventilating Co., Akron, O.
U. S. Pressed Steel Products Co., Kalamazoo, Mich.
●Waterman-Waterbury Co., Minneapolis, Minn.
Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GAS AUXILIARY, CAST IRON

Andes Range & Furnace Corp., Geneva, N. Y.
Beck Engineering Combustion Kompany, St. Louis, Mo.
●Chandler Co., Cedar Rapids, Ia.
●Forest City Foundries Co., Cleveland, O.
Germer Stove Co., Erie, Pa.
●Henry Furnace & Foundry Co., Cleveland, O.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Reznor Mfg. Co., Mercer, Pa.
Rosebraugh Co., W. W., Salem, Ore.
●Twentieth Century Heating & Ventilating Co., Akron, O.
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GAS AUXILIARY, STEEL

Arcweld Mfg. Co., Seattle, Wash.
●Dail Steel Products Co., Lansing, Mich.
●Forest City Foundries Co., Cleveland, O.
●Joliet Heating Corp., Joliet, Ill.
Lee Heating Systems, Youngstown, O.
Milwaukee Welded Steel Corp., Milwaukee, Wis.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Robinson Heating & Ventilating Corp., Massillon, O.
Rock Island Stove Co., Rock Island, Ill.
●Thompson Mfg. Co., Denver, Colo.
U. S. Pressed Steel Products Co., Kalamazoo, Mich.
●Ward Heater Co., Ltd., Los Angeles, Cal.
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GAS BURNING, CAST IRON
(Complete with burner)

●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., Cleveland, O.
Favorite Mfg. Co., Piqua, O.
●Forest City Foundries Co., Cleveland, O.
●Fox Furnace Co. Elyria, O.
Green Foundry & Furnace Works, Des Moines, Iowa.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland, O.
Jackson Sheet Metal Works, Ogden, Utah. (Combination Iron and Steel)
Johnson Gas Furnace Corp., Los Angeles, Cal.
Kelsey Heating Co., Syracuse, N. Y.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.
Reznor Mfg. Co., Mercer, Pa.
●Rudy Furnace Co., Dowagiac, Mich.
Standard Furnace & Supply Co., Omaha, Nebr.
Ward Heater Co., Ltd., Los Angeles, Cal.
●Wise Furnace Co., Akron, O.

FURNACES, WARM AIR, GAS BURNING, STEEL

(Complete with burner)

Aladdin Heating Corp., Oakland, Cal.
American Furnace Co., St. Louis, Mo.
Ames Co., W. R., San Francisco, Cal.
●Armstrong Furnace Co., Columbus, O.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bryant Corp., C. L., Cleveland, O.
Burmester Gas Furnace Mfg. Co., Omaha, Nebr. (Sheet Iron)
Calkins & Pearce, Columbus, O.
Cocking, Geo. J., Santa Ana, Cal.
●Dail Steel Products Co., Lansing, Mich.
Delco Appliance Corp., Rochester, N. Y.
Edwards Mfg. Co., Inc., Cincinnati, O.
Electrogas Furnace & Mfg. Co., San Francisco, Cal.
Falco Furnace Co., San Francisco, Cal.
●Forest City Foundries Co., Cleveland, O.
Foss Heating & Engineering Co., Pasadena, Cal.
●Fox Furnace Co., Elyria, O.
●Hess-Snyder Co., Massillon, O.
Independence Stove & Furnace Co., Independence, Mo.
Johnston Gas Furnace Corp., Los Angeles, Cal.
Lee Heating Systems, Youngstown, O.
●Lennox Furnace Co., Marshalltown, Ia.
●Meyer Furnace Co., Peoria, Ill.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Nelson Co., Detroit, Mich.
Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Payne Furnace & Supply Co., Beverly Hills, Call.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.
Robinson Heating & Ventilating Corp., Massillon, O.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
Security Stove & Mfg. Co., Kansas City, Mo.
Surface Combustion Corp., Toledo, O.
Texo Sales & Mfg. Co., Cincinnati, O.
●Thompson Mfg. Co., Denver, Col.
●Twentieth Century Heating & Ventilating Co., Akron, O.
Ward Heater Co., Ltd., Los Angeles, Cal.
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GAS OR OIL BURNING, CAST IRON

(No burner furnished)

Airtherm Mfg. Co., St. Louis, Mo.
Andes Range & Furnace Corp., Geneva, N. Y.
●Chandler Co., Cedar Rapids, Ia.
Edwards Furnace Co., Wellsboro, Pa.
●Excelsior Steel Furnace Co., Chicago, Ill.
●Forest City Foundries Co., Cleveland, O.
Green Foundry & Furnace Works, Des Moines, Ia.
Hart & Crouse Co., Inc., Utica, N. Y.
●Henry Furnace & Foundry Co., Cleveland, O.
Ideal Furnace Co., Detroit, Mich.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Marshall Furnace Co., Marshall, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Rudy Furnace Co., Dowagiac, Mich.
Schwab Gilt Edge Furnace & Mfg. Co., Cedar Grove, Wis.
Spear Stove & Heating Co., James, Philadelphia, Pa.
Thatcher Co., Newark, N. J.

FURNACES, WARM AIR, GAS OR OIL BURNING, STEEL

(No burner furnished)

American Furnace Co., St. Louis, Mo.
Arcweld Mfg. Co., Seattle, Wash.
●Armstrong Furnace Co., Columbus, O.
Brown Sheet Iron & Steel Co., St. Paul, Minn.
Bryan Plumbing & Heating Co., Bryan, O.
●Campbell Heating Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Cary Mfg. Co., Waupaca, Wis.
●Dail Steel Products Co., Lansing, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Economy Baler Co., Ann Arbor, Mich.
Enterprise Boiler & Tank Wks., Inc., Chicago, Ill.
Evans Corp., George, Moline, Ill.
●Excelsior Steel Furnace Co., Chicago, Ill.
Farquhar Furnace Co., Wilmington, O.
●Forest City Foundries Co., Cleveland, O.
●Fox Furnace Co., Elyria, O.
Gehri Co., Tacoma, Wash.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Henry Furnace & Foundry Co., Cleveland, O.
●Hess-Snyder Co., Massillon, O.
●Hess Warming & Ventilating Co., Chicago, Ill.
Ideal Furnace Co., Detroit, Mich.
●Joliet Heating Corp., Joliet, Ill.
Kelsey Heating Co., Syracuse, N. Y.
Kruse Co., Inc., Indianapolis, Ind.
Kruse & Dewenter Co., Indianapolis, Ind.
Lee Heating Systems, Youngstown, O.
●Lennox Furnace Co., Marshalltown, Ia.
●Liberty Foundry Co., St. Louis, Mo.
Lookout Furnace Co., Chattanooga, Tenn.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Marshall Furnace Co., Marshall, Mich.
●Meyer Furnace Co., Peoria, Ill.
Milwaukee Welded Steel Corp. Milwaukee Wis.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Nelson Co., Detroit, Mich.
●Oil Burner Builders, Inc., Rock Island, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
Premier Furnace Co., Dowagiac, Mich.
Rock Island Stove Co., Rock Island, Ill.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
Scott-Newcomb, Inc., St. Louis, Mo.
Schwab Gilt Edge Furnace & Mfg. Co., Cedar Grove, Wis.
Smuck-Thiele Co., Indianapolis, Ind.
Thatcher Co., Newark, N. J.
●Twentieth Century Heating & Ventilating Co., Akron, O.
●Thompson Mfg. Co., Denver, Col.
U. S. Pressed Steel Products Co., Kalamazoo, Mich.
●Waterman-Waterbury Co., Minneapolis, Minn.
●Wise Furnace Co., Akron, O.
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, HORIZONTAL

●Acme Heating & Ventilating Co., Chicago, Ill.
●American Foundry & Furnace Co., Bloomington, Ill.
Columbus Heating & Ventilating Co., Columbus, O.
●Forest City Foundries Co., Cleveland, O.
Gehri Co., Tacoma, Wash.
Krause & Dewenter Co., Indianapolis, Ind.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Moncrief Furnace Co., Atlanta, Ga.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
New York Blower Co., Chicago, Ill.
Rosebraugh Co., W. W., Salem, Ore.
●Twentieth Century Heating & Ventilating Co., Akron, O.
Western Furnaces, Inc., Tacoma, Wash.
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, OIL BURNING, CAST IRON

(Complete with burner)

●Chandler Co., Cedar Rapids, Ia.
●Forest City Foundries Co., Cleveland, O.
Green Foundry & Furnace Works, Des Moines, Ia.
Keith Furnace Co., Des Moines, Ia.

FURNACES, WARM AIR, OIL BURNING, STEEL

(Complete with burner)

American Furnace Co., St. Louis, Mo.
●Armstrong Furnace Co., Columbus, O.
Cary Mfg. Co., Waupaca, Wis.
Century Engineering Corp., Cedar Rapids, Ia.
Edwards Mfg. Co., Inc., Cincinnati, O.
●Forest City Foundries Co., Cleveland, O.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Health Air Systems, Inc., Detroit, Mich.
Heil Co., Milwaukee, Wis.
Hotentot Co., Inc., Omaha, Nebr.
Ingle Mfg. Co., San Diego, Cal.
●Joliet Heating Corp., Joliet, Ill.
Kruse Co., Inc., Indianapolis, Ind.
Lee Heating Systems, Youngstown, O.
Little Burner Co., Inc., H. C., San Rafael, Cal.
Lochinvar Corp., Detroit, Mich.
May Oil Burner Corp., Baltimore, Md.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
Motor Wheel Corp., Lansing, Mich.
Nelson Co., Detroit, Mich.
●Nu-Way Corp., Rock Island, Ill.
●Oil Burner Builders, Inc., Rock Island, Ill.
Perfect Burner Co., Lynn, Mass.
Perfection Stove Co., Cleveland, O.
Scott-Newcomb, Inc., St. Louis, Mo.
Wayne Oil Burner Corp., Fort Wayne, Ind.
●Wood Industries, Inc., Gar, Detroit, Mich.
York Oil Burner Co., Inc., York, Pa.

FURNACES, WARM AIR, PIPELESS, CAST IRON

Agricola Furnace Co., Inc., Gadsden, Ala.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
Andes Range & Furnace Corp., Geneva, N. Y.
Barry Furnace Co., Hamilton, O.
●Brillion Furnace Co., Brillion, Wis.
●Chandler Co., Cedar Rapids, Ia.
Danville Stove & Mfg. Co., Danville, Pa.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Edwards Furnace Co., Wellsboro, Pa.
Emrich Co., C., Columbus, O.
Enterprise Boiler & Tank Works, Inc., Chicago, Ill.
Enterprise Foundry Co., Belleville, Ill.
●Excelsior Steel Furnace Co., Chicago, Ill.

Excelsior Stove & Mfg. Co., Quincy, Ill.
Favorite Mfg. Co., Piqua, O.
Floyd-Wells Co., Royersford, Pa.
●Forest City Foundries Co., Cleveland, O.
●Fox Furnace Co., Elyria, O.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Harold Furnace Mfg. Co., Spokane, Wash.
Hart & Crouse Co., Inc., Utica, N. Y.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland, O.
●"Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Home Furnace Co., Holland, Mich.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit, Mich.
International Heater Co., Utica, N. Y.
Johnston Gas Furnace Corp., Los Angeles, Cal. (Gas)
Kalamazoo Stove Co., Kalamazoo, Mich.
Kansas City Furnace Co., Kansas City, Mo.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
●Liberty Foundry Co., St. Louis, Mo.
MaGirl Foundry & Furnace Works, P. H. Bloomington, Ill.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
Moore Corp., Joliet, Ill.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Orbon Stove Co., Belleville, Ill.
●Pittston Stove Co., Pittston, Pa.
Premier Furnace Co., Dowagiac, Mich.
Ravenna Furnace & Heating Co., Ravenna, O.
●Richardson & Boynton Co., New York City.
Robinson Furnace Co., Chicago, Ill.
●Round Oak Co., Dowagiac, Mich.
●Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
St. Clair Foundry Corp., Centralia, Ill.
Schill Mfg. Co., Crestline, O.
Schwab Gilt Edge Furnace & Mfg. Co., Cedar Grove, Wis.
Security Stove & Mfg. Co., Kansas City, Mo.
●Standard Foundry & Furnace Co., DeKalb, Ill.
Standard Furnace & Supply Co., Omaha, Nebr.
Stanton Heater Co., Martins Ferry, O.
Thatcher Co., Newark, N. J.
●Twentieth Century Heating & Ventilating Co., Akron, O.
Walker & Pratt Mfg. Co., Boston, Mass.
Ward Heater Co., Ltd., Los Angeles, Cal.
Washington Stove Works, Everett, Wash.
Western Furnaces, Inc., Tacoma, Wash.
Westwick & Son, Inc., John, Galena, Ill.
Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
●XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, PIPELESS, STEEL

Aladdin Heating Corp., Oakland, Cal.
Arcweld Mfg. Co., Inc., Seattle, Wash.
●Armstrong Furnace Co., Columbus, O.
Brown Sheet Iron & Steel Co., St. Paul, Minn.
Campbell Heating Co., Des Moines, Ia.
●Dall Steel Products Co., Lansing, Mich.
Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Electrogas Furnace & Mfg. Co., San Francisco, Cal.
Enterprise Boiler & Tank Works, Inc., Chicago, Ill.
Falco Furnace Co., San Francisco, Cal.
●Forest City Foundries Co., Cleveland, O.
Hall-Neal Furnace Co., Indianapolis, Ind.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland, O.
●Hess Warming & Ventilating Co., Chicago, Ill.
●"Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit, Mich.
Ingle Mfg. Co., San Diego, Cal.
International Heater Co., Utica, N. Y.
Kelsey Heating Co., Syracure, N. Y.
Klein Stove Co., Philadelphia, Pa.
Koons Furnace Co., Danville, Ill.
Kruse & Dewenter Co., Indianapolis, Ind.
●Lennox Furnace Co., Marshalltown, Ia.
●Liberty Foundry Co., St. Louis, Mo.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Majestic Furnace Co., Seattle, Wash.
Marshall Furnace Co., Marshall, Mich.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
Nugent Sons, Inc., Thos., New York City
Orbon Stove Co., Belleville, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Roberts-Hamilton Co., Minneapolis, Minn.
Robinson Heating & Ventilating Corp., Massillon, O.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
Schill Mfg. Co., Crestline, O.
●Thompson Mfg. Co., Denver, Colo.
●Twentieth Century Heating & Ventilating Co., Akron, O.
U. S. Pressed Steel Products Co., Kalamazoo, Mich.
Ward Heater Co., Ltd., Los Angeles, Cal.
●Waterman-Waterbury Co., Minneapolis, Minn.
●XXth Century Heating & Ventilating Co., Akron, O.

GAGES, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
●Friez & Sons, Inc., Julien P., Baltimore, Md.
●Hays Corp., Michigan City, Ind.
Hill Co., E., Vernon, Chicago, Ill.
Moeller Instrument Co., Brooklyn, N. Y.
Precision Thermometer & Instrument Co., Philadelphia, Pa.

GAS AUXILIARY FURNACES

See Furnaces, Warm Air, Gas Auxiliary, Cast Iron and Steel

GAS BURNERS

See Burners, Gas, Conversion

GAS PRESSURE REGULATING VALVES

See Valves, Gas Pressure Regulating

GLAZING COMPOUNDS

See Compounds, Glazing

GRILLES, HEATING AND VENTILATING

American Blower Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
●Auer Register Co., Cleveland, O.
Best Register Co., Milwaukee, Wis.
Carrier Engineering Corp., Newark, N. J.
Central Wire & Iron Works, Des Moines, Ia.
Chicago Perforating Co., Chicago, Ill.
Cincinnati Mfg. Co., Cincinnati, O.
Commodore Heaters Corp., New York City.
Cross Engineering Co., Carbondale, Pa.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Globe Machine & Stamping Co., Cleveland, O.
●Harrington & King Perforating Co., Chicago, Ill.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hendrick Mfg. Co., Carbondale, Pa.
●Independent Register & Mfg. Co., Cleveland, O.
Johnson & Chapman Co., Chicago, Ill.
●Lamneck Products, Inc., Columbus, O.
●Liberty Foundry Co., St. Louis, Mo.
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Metalace Corp., South Boston, Mass.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Mundt & Sons, Charles, Jersey City, N. J.
Newman Brothers, Inc., Cincinnati, O.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rock Island Register Co., Rock Island, Ill.
Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
●Waterloo Register Co., Waterloo, Ia.
Western Blower Co., Seattle, Wash.
Western Wire & Iron Works, Inc., Chicago, Ill.
●Wickwire Spencer Steel Co., New York City.

GUARDS, SNOW

Berger Co., L. D., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Danzer Metal Works, Inc., Hagerstown, Md.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Folsom Snow Guard Co., Boston, Mass.
●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
Levow, David, New York City.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill.
●Wickwire Spencer Steel Co., New York City.

GUTTERS

See Eaves Trough and Gutters

HEAT TRANSFER SURFACE

See Coils, Cooling, Direct Expansion; Coils, Heating; Coils, Cooling, Water

HEATERS, CABINET

Agricola Furnace Co., Inc., Gadsden, Ala.
●American Radiator Co., New York City.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Cary Mfg. Co., Waupaca, Wis.
Continental Stove Corp., Ironton, O. (Gas).
Emrich Co., C., Columbus, O.
Estate Stove Co., Hamilton, O.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Floyd-Wells Co., Royersford, Pa.

Fox Engineering Co., Boston, Mass.
●Fox Furnace Co., Elyria, O.
Hart Mfg. Co. Louisville Ky.
Hayes Custer Stove Co. Bloomington Ill.
Home Stove Co. Indianapolis, Ind.
Independence Stove & Furnace Co. Independence, Mo.
Ingle Mfg. Co., San Diego, Cal.
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil Burning)
Lochinvar Corp., Detroit, Mich. (Oil Burning)
Montag Stove & Furnace Works, Portland, Ore.
Moore Corp, Joliet, Ill.
Motor Wheel Corp., Lansing, Mich.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Nesbitt, Inc., John J., Philadelphia, Pa.
Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
Orbon Stove Co., Belleville, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Patten Co., J. V., Sycamore, Ill.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfection Stove Co., Cleveland, O.
Premier Furnace Co., Dowagiac, Mich.
Quaker Mfg. Co., Chicago, Ill. (Oil Burning).
Regal Metal Products Co., Chicago, Ill.
Reznor Mfg. Co., Mercer, Pa.
Rock Island Stove Co., Rock Island, Ill.
Schoedinger Co., F. O., Columbus, O.
Security Stove & Mfg. Co., Kansas City, Mo.
Silent Sioux Oil Burner Corp., Orange City, Ia.
Texo Sales & Mfg. Co., Cincinnati, O. (Gas).
Ward Heater Co., Ltd., Los Angeles, Cal.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.

HEATERS, SCHOOL ROOM

Agricola Furnace Co., Inc. Gadsden Ala.
●American Foundry & Furnace Co., Bloomington, Ill.
Barry Furnace Co., Hamilton, O.
Beck Engineering Combustion Kompany, St. Louis, Mo.
●Brillion Furnace Co., Brillion, Wis.
Campbell Heating Co., Des Moines, Ia.
●Chandler Co., Cedar Rapids, Ia.
Danville Stove & Mfg. Co., Danville, Pa.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Edwards Furnace Co., Wellsboro, Pa.
Estate Stove Co., Hamilton, O.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Farris Furnace Co., Springfield, Ill.
●Fox Furnace Co., Elyria, O.
Gem City Stove Co., Dayton, O.
Harold Furnace Mfg. Co., Spokane, Wash.
Hart & Crouse Co., Inc., Utica, N. Y.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland, O.
Home Stove Co., Indianapolis, Ind.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
Koons Furnace Co., Danville, Ill.
●Lennox Furnace Co., Marshalltown, Ia.
Little Burner Co., Inc., H. C., San Rafael, Cal.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
●Meyer Furnace Co., Peoria, Ill.
Moore Corp., Joliet, Ill.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
Orbon Stove Co., Belleville, Ill.
Patten Co., J. V., Sycamore, Ill.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfection Stove Co., Cleveland, O.
●Pittston Stove Co., Pittston, Pa.
Portland Stove Foundry Co., Portland, Me.
Rock Island Stove Co., Rock Island, Ill.
●Round Oak Co., Dowagiac, Mich.
●Rudy Furnace Co., Dowagiac, Mich.
●Standard Foundry & Furnace Co., De Kalb, Ill.
Standard Furnace & Supply Co., Omaha, Nebr.
●Twentieth Century Heating & Ventilating Co., Akron, O.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.
Williamson Heater Co., Cincinnati, O.
●XXth Century Heating & Ventilating Co., Akron, O.

HEATING COILS

See Coils, Heating

HUMIDIFIER FITTINGS

See Fittings, Humidifier, Water Line

HUMIDIFIERS, FURNACE, EVAPORATION, AUTOMATIC

●American Foundry & Furnace Co., Bloomington, Ill.
●Automatic Humidifier Co., Cedar Falls, Ia.
Bishop Humidifier Co., Detroit, Mich.
Bryant Heater Co., Cleveland, O.
Cary Mfg. Co., Waupaca, Wis.
●Chandler Co., Cedar Rapids, Ia.
Clarm Mechanical Devices Co., Lima, O.
●Columbus Humidifier Co., Columbus, O.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
●Fox Furnace Co., Elyria, O.
Green Foundry & Furnace Works, Des Moines, Ia.
Health-O-Mist Humidifier Mfg. Co., Columbus, Wis.
●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Hotentot Co., Inc., Omaha, Nebr.
Humidity Headquarters, Cleveland, O.
Hum-O-Zone Co., Horicon, Wis.
Ideal Furnace Co., Detroit, Mich.
Iowa Foundry Co., Sioux City, Ia.
Kleenaire Corp., Stevens Point, Wis.
Kraker, Henry, Holland, Mich.
●Maid-O'-Mist, Inc., Chicago, Ill.
Marshall Furnace Co., Marshall, Mich.
McDonnell & Miller, Chicago, Ill.
●Meyer Furnace Co., Peoria, Ill.
●Monmouth Products Co., Cleveland, O.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Perfect Burner Co., Lynn, Mass.
R-S Products Corp., Philadelphia, Pa.
●Richardson & Boynton Co., New York City.
Roberts-Hamilton Co., Minneapolis, Minn.
Rochester Mfg. Co., Inc., Rochester, N. Y.
●Round Oak Co., Dowagiac, Mich.
●Rudy Furnace Co., Dowagiac, Mich.
●Russell Electric Co., Chicago, Ill.
Sallada Mfg. Co., Minneapolis, Minn.
●Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
Security Stove & Mfg. Co., Kansas City, Mo.
Skilbeck Mfg. Co., Kenosha, Wis.
Skuttle Co., J. L., Detroit, Mich.
Thatcher Co., Newark, N. J.
U. S. Pressed Steel Products Co., Kalamazoo, Mich.
Universal Blower Co., Birmingham, Mich.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co. Seattle, Wash.
●Wisconsin Humidifier Co., Milwaukee, Wis.

HUMIDIFIERS, FURNACE, SPRAY, AUTOMATIC

●American Foundry & Furnace Co., Bloomington, Ill.
Ames Co., W. R., San Francisco, Cal.
Bishop & Babcock Sales Co., Cleveland, O.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Co., Cleveland, O.
●Fox Furnace Co., Elyria, O.
Handelan Washed Air Co., Minneapolis, Minn.
●Lennox Furnace Co., Marshalltown, Ia.
●Meyer Furnace Co., Peoria, Ill.
Parks-Cramer Co., Fitchburg, Mass.
Rega Mfg. Co., Rochester, N. Y.
Research Corp., New York City.
Standard Engineering Works, Pawtucket, R. I. (Room type)
Supreme Electric Products Corp., Rochester, N. Y.
Thatcher Co., Newark, N. J.
United American Bosch Corp., Springfield, Mass.
U. S. Air Conditioning Corp., Minneapolis, Minn.

HUMIDISTATS

Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
●Detroit Lubricator Co., Detroit, Mich.
●Fox Furnace Co., Elyria, O. (Wood Element)
●Friez & Sons, Inc., Julien P., Baltimore, Md. (Human hair element)
Lewis Air Conditioners, Inc., Minneapolis, Minn. (Hygroscopic paper element)
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. (Human Hair)
Johnson Service Co., Milwaukee, Wis. (Hair, Membrane, Wood)
Penn Electric Switch Co., Des Moines, Ia. (Parchment)
Ripley Co., W. R., Tacoma, Wash. (Flexing)
●Russell Electric Co., Chicago, Ill. (Wood)
Standard Engineering Works, Pawtucket, R. I.

HUMIDITY CONTROLS

See Humidistats

INSTRUMENTS, INDICATING, RECORDING AND TESTING

Bacharach Industrial Instrument Co., Pittsburgh, Pa. (Flue gas analyzers, manometers)
Bailey Meter Co., Cleveland, O.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Philadelphia, Pa. (Flow, pressure, temperature)
Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.
Cooper Oven Thermometer Co., Pequabuck, Conn. (Indicating)
Dusinberre Indicator Co., Kew Gardens, N. Y. (Indicating, testing)
Ellison Draft Gage Co., Chicago, Ill. (Air filter gages, calorimeters, gas analyzers, pitot tubes)
Fee & Stemwedel, Inc., Chicago, Ill. (Barometers, hygrometers, thermometers)
●Friez & Sons, Inc., Julien P., Baltimore, Md. (Humidity, temperature and electrical operation)
●General Electric Co. Schenectady N. Y.
●Hays Corp., Michigan City, Ind. (Combustion)
Hill Co., E. Vernon, Chicago, Ill. (Indicating and testing)

Illinois Testing Laboratories, Inc., Chicago, Ill. (Anemometers ,pyrometers, thermometers)
Johnson Mfg. Co., Urbana, O. (Humidity indicating)
Johnson Tool Co., Inc., East Providence, R. I. (Airmeter)
Leeds & Northrup Co., Philadelphia, Pa. (Gas analysis, humidity, temperature, etc.)
Lewis Air Conditioners, Inc., Minneapolis, Minn. (Humidity)
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. (CO_2, flow, humidity, liquid level, temperature)
Mitchell, A., Chicago, Ill. (Hygrometers)
Moeller Instrument Co., Brooklyn, N. Y. (Hygrometer, psychrometer, thermometer)
Morey & Jones, Ltd., Los Angeles, Cal. (Flow)
Practical Instrument Co., Chicago, Ill. (Recording thermometers and operation)
Precision Thermometer and Instrument Co., Philadelphia, Pa. (Indicating and testing)
Rochester Mfg. Co., Inc., Rochester, N. Y. (Humidity and temperature)
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y. (Pressure gages, thermometers)

INSULATION, DUCT

Airven Co., New York City. (Cork and Steel)
Alfol Insulation Co., New York City
American Flange & Mfg. Co., Inc., New York City
American Hair & Felt Co., Chicago, Ill.
Burgess Battery Co., Chicago, Ill. (Sound Deadening)
Cabot, Inc., Samuel, Boston, Mass.
Celotex Co., Chicago, Ill.
Cork Import Corp., New York City (Corkboard)
Cork Insulation Co., Inc., New York City (Cork)
Eagle-Picher Lead Co., Cincinnati, O. (Rockwool blankets)
General Insulating & Mfg. Co., Alexandria, Ind.
Insulite Co., Minneapolis, Minn.
Johns-Manville, New York City (Rock Cork)
Masonite Corp., Chicago, Ill.
Mineral Felt Co., Toledo, O.
Mineral Insulation Co., Chicago Ridge, Ill.
Mundet Cork Corp., New York City (Cork)
National Asbestos Mfg. Co., Jersey City, N. J. (Asbestos)
●Owens-Illinois Glass Co., Newark, O.
Presstite Engineering Co., St. Louis, Mo.
Robertson Co., H. H., Pittsburgh, Pa.
Rock Wool Products Co., Inc., Wabash, Ind.
Ruberoid Co., New York City (Asbestos cellular and laminated sheets)
●Sall Mountain Co., Chicago, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Thermax Division, Northwest Magnesite Co., Pittsburgh, Pa.
Therminsul Corp. of America, Kalamazoo, Mich.
Union Fibre Co., Inc., Winona, Minn.
United Cork Companies, Lyndhurst, N. J.
●Wilson & Co., Inc., Chicago, Ill. (Hairbestos)
Wilson, Inc., Grant, Chicago, Ill.

INSULATION, FURNACE AND PIPE

Alfol Insulation Co., New York City.
Carey Co., Philip, Lockland, Cincinnati, O.
General Insulating & Mfg. Co., Alexandria, Ind. (Blanket)
Eagle Picher Lead Co., Cincinnati, O. (Vercel Blocks)
Johns-Manville, New York City (All types)
Keasbey & Mattison Co., Ambler, Pa.
Mineral Insulation Co., Chicago Ridge, Ill.
National Asbestos Mfg. Co., Jersey City, N. J. (Asbestos)
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Rock Wool Products Co., Inc., Wabash, Ind. (Rock Wool)
Ruberoid Co., New York City (Asbestos & Magnesia)
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Lime & Stone Co., Baltimore, Md.
Union Fibre Co., Inc., Winona, Minn.
Wilson, Inc., Grant, Chicago, Ill.

INSULATION, ROOF

Alfol Insulation Co., New York City
Alton Mineral Wool Co., Alton, Ill.
American Flange & Mfg. Co., Inc., New York City
Armstrong Cork Products Co., Lancaster, Pa. (Cork)
Barrett Co., New York City (Tar felt)
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Lockland, Cincinnati, O.
Celotex Co., Chicago, Ill.
Certain-teed Products Corp., New York City (Rigid fibre)
Cork Import Corp., New York City (Corkboard)
Cork Insulation Co., Inc., New York City (Cork)
Cornell Wood Products Co., Chicago, Ill.
Eagle Picher Lead Co., Cincinnati, O. (Rockwool)
General Insulating & Mfg. Co., Alexandria, Inc. (Blanket)
Insulite Co., Minneapolis, Minn.
Johns-Manville, New York City (Rock wool, fibre board)
Masonite Corp., Chicago, Ill.
Mineral Insulation Co., Chicago Ridge, Ill.
Mundet Cork Corp., New York City (Cork)
●Owens-Illinois Glass Co., Newark, O.
Reynolds Corp., New York City
Robertson Co., H. H., Pittsburgh, Pa.
Rock Wool Products Co., Inc., Wabash, Ind. (Granulated rock wool)
Ruberoid Co., New York City (Mineral wool)
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Lime & Stone Co., Baltimore, Md.
Thermax Division, Northwest Magnesite Co., Pittsburgh, Pa.
Therminsul Corp. of America, Kalamazoo, Mich.
Union Fibre Co., Inc., Winona, Minn.
United Cork Companies, Lyndhurst, N. J.
United States Gypsum Co., Chicago, Ill.
Upson Quality Products, Inc., Lockport, N. Y. (Flexible and rigid)
Wilson, Inc., Grant, Chicago, Ill.
●Wilson & Co., Inc., Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.

INSULATION, WALL

Alfol Insulation Co., New York City.
Alton Mineral Wool Co., Alton, Ill.
Aluminum Co. of America, Pittsburgh, Pa. (Aluminum Foil)
American Flange & Mfg. Co., Inc., New York City.
Armstrong Cork Products Co., Lancaster, Pa. (Cork)
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Lockland, Cincinnati, O.
Celotex Co., Chicago, Ill.
Certain-teed Products Corp., New York City. (Rigid Fibre)
Cork Import Corp., New York City. (Corkboard)
Cork Insulation Co., Inc., New York City. (Cork)
Cornell Wood Products Co., Chicago, Ill.
Eagle-Picher Lead Co., Cincinnati, O. (Rock Wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
General Insulating & Mfg. Co., Alexandria, Ind. (Blanket)
Insulite Co., Minneapolis, Minn.
Johns-Manville, New York City. (Rock Wool, Fibre Board)
Keasbey & Mattison Co., Ambler, Pa.
Masonite Corp., Chicago, Ill.
●Milcor Steel Co., Milwaukee, Wis.
Mineral Felt Co., Toledo, O.
Mineral Insulation Co., Chicago Ridge, Ill.
Mundet Cork Corp., New York City. (Cork)
Norristown Magnesia & Asbestos Co., Norristown, Pa.
●Owens-Illinois Glass Co., Newark, O.
Pacific Lumber Co., San Francisco, Cal. (Loose Fill)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Reynolds Corp., New York City.
Robertson Co., H. H., Pittsburgh, Pa.
Rock Wool Products Co., Inc., Wabash, Ind. (Loose Rock Wool)
Ruberoid Co., New York City. (Mineral Wool)
Smith & Kanzler, Inc., Elizabeth, N. J.
Sprayo-Flake Co., Milwaukee, Wis.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Lime & Stone Co., Baltimore, Md.
Thermax Division, Northwest Magnesite Co., Pittsburgh, Pa.
Therminsul Corp. of America, Kalamazoo, Mich.
Union Fibre Co., Inc., Winona, Minn.
United Cork Companies, Lyndhurst, N. J.
United States Gypsum Co., Chicago, Ill.
U. S. Mineral Wool Co., New York City.
Upson Quality Products, Inc., Lockport, N. Y. (Flexible and Rigid)
●Wilson & Co., Inc., Chicago, Ill. (Haircraft)
Wilson, Inc., Grant, Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.

KETTLES, ROOFERS'

Aeroil Burner Co., Inc., West New York, N. J.
All States Roofers Equipment & Material Co., Chicago, Ill.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
●Chicago Metal Mfg. Co., Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Hauck Mfg. Co., Brooklyn, N. Y.
Southbridge Roofing Co., Inc., Southbridge, Mass.

LEADER STRAPS

See Fittings and Accessories, Conductor

LIFTS, SKYLIGHT

Danzer Metal Works, Inc., Hagerstown, Md.
Dayton Greenhouse Mfg. Co., Dayton, O.
Drummond Sheet Metal Works, Wichita, Kan.
Hudson Equipment Corp., Minneapolis, Minn.
Levow, David, New York City. (Gearing)
Park City Cornice Works, Inc., Bridgeport, Conn.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Van Noorden Co., E., Boston, Mass.
Weiss & Co., H., New York, City.

LININGS

See Refractories

LOUVRES, VENTILATING

Allen Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
American Sheet Metal Works, New Orleans, La.
Ames Co., W. R., San Francisco, Cal.
Arex Co., Chicago, Ill.
Barber-Colman Co., Rockford, Ill.
Biersach & Niedermeyer Co., Milwaukee, Wis.
●Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
●Campbell Heating Co., E. K., Kansas City, Mo.
Champion Blower & Forge Co., Lancaster, Pa.
●Chicago Metal Mfg. Co., Chicago, Ill.
●Clarage Fan Co., Kalamazoo, Mich.

Clay Equipment Corp., Cedar Falls, Ia.
Danzer Metal Works, Inc., Hagerstown, Md.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Drummond Sheet Metal Works, Wichita, Kan.
Economy Electric Mfg. Co., Cicero, Ill.
●Elgo Shutter & Mfg. Co., Detroit, Mich.
Falstrom Co., Passaic, N. J.
●General Regulator Corp., Chicago, Ill.
Globe Machine & Stamping Co., Cleveland, O.
Harold Furnace Mfg. Co., Spokane, Wash.
Herrmann & Grace Co., Brooklyn, N. Y.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Hudson Equipment Corp., Minneapolis, Minn.
●Jordan & Co., Paul R., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kleenaire Corp., Stevens Point, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Everett, Mass.
Martin Metal Mfg. Co., Wichita, Kan.
Myco Mfg. Co., Detroit, Mich.
Myers Electric Co., Pittsburgh, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Perkinson & Brown, Chicago, Ill.
●Providence Cornice Co., Providence, R. I.
Richmond Fireproof Door Co., Richmond, Ind.
Robertson Co., H. H., Pittsburgh, Pa.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Tiffin Art Metal Co., Tiffin, O.
Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
Van Noorden Co., E., Boston, Mass.
●Waterloo Register Co., Waterloo, Ia.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

MACHINERY, REBUILT AND USED

●Interstate Machinery Co., Inc., Chicago, Ill.
●Maplewood Machinery Co., Inc., Chicago, Ill.
●Ward Machinery Co., Chicago, Ill.

MACHINES, CRIMPING

Bertsch & Co., Cambridge City, Ind.
Excelsior Tool and Machine Co., East St. Louis, Ill.
●Maplewood Machinery Co., Inc., Chicago, Ill.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Packham Crimper Co., Mechanicsburg, O.
Peck, Stow & Wilcox Co., Southington, Conn.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Yoder Co., Cleveland, O.

MACHINES, ELBOW

●Maplewood Machinery Co., Inc., Chicago, Ill.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, NIBBLING

Hendley & Whittemore Co., Beloit, Wis.
National Machine Tool Co., Racine, Wis.
Pels & Co., Inc., Henry, New York City
Rock River Machine Co., Inc., Janesville, Wis.

MACHINES, SEAMING

Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Danzer Metal Works, Inc., Hagerstown, Md.
●Maplewood Machinery Co., Inc., Chicago, Ill.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., St. Marys, O.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Weiss & Co., H., New York City
Yoder Co., Cleveland, O.

MACHINES, SLITTING

Bertsch & Co., Cambridge City, Ind.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Hendley & Whittemore Co., Beloit, Wis.
●Maplewood Machinery Co., Inc., Chicago, Ill.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., St. Marys, O.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Yoder Co., Cleveland, O.

MACHINES, WIRING

Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
●Maplewood Machinery Co., Inc., Chicago, Ill.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., St. Marys, O.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Yoder Co., Cleveland, O.

MAGNETIC SWITCHES

See Switches, Magnetic

METALS, PERFORATED, SHEET AND PLATE

Chase Brass & Copper Co., Waterbury, Conn.
Chicago Perforating Co., Chicago, Ill.
Cross Engineering Co., Carbondale, Pa.
Crucible Steel Co., of America, New York City
Diamond Mfg. Co., Wyoming, Pa.
Erdie Perforating Co., Rochester, N. Y.
Hall Metal Products Co., Long Beach, Cal.
●Harrington & King Perforating Co., Chicago, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendrick Mfg. Co., Carbondale, Pa.
●International Nickel Co., Inc., New York City (Monel Metal and Nickel)
Johnston & Chapman Co., Chicago, Ill.
Littleford Bros., Cincinnati, O.
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Metalace Corp., South Boston, Mass.
Mundt & Sons, Charles, Jersey City, N. J.
Newark Wire Cloth Co., Newark, N. J. (Wire Cloth)
Nortmann-Duffke Co., Milwaukee, Wis.
●Revere Copper & Brass, Inc., New York City
Standard Stamping & Perforating Co., Chicago, Ill.
●Wickwire Spencer Steel Co., New York City

MOP HEADS, ROOFERS'

All States Roofers Equipment & Material Co., Chicago, Ill.
Capital Mfg. Co., Kingsville, Tex.
Cupples Co., St. Louis, Mo.
Fisele Mop Mfg. Co., Thos. J., St. Louis, Mo.
Heartley Machine & Tool Co., Toledo, O.
Levow, David, New York City
Mill Products Co., Elberton, Ga.
Southbridge Roofing Co., Inc., Southbridge, Mass.

MOTORS, DAMPER, DUCT

Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
General Controls Co., San Francisco, Cal, and Cleveland, O.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Controls Co., Milwaukee, Wis.
Sheer Co., H. M., Quincy, Ill.
●White Mfg. Co., St. Paul, Minn.

MOTORS, DAMPER, FURNACE DRAFT, ELECTRICAL

Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich. (Liquid)
General Controls Co., San Francisco, Cal., and Cleveland, O.
●General Electric Co., Schenectady, N. Y.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modern Heat Regulator Co., Cleveland, O.
Perfex Controls Co., Milwaukee, Wis.
Pioneer Heat Regulator Corp., Dayton, O.
●Russell Electric Co., Chicago, Ill.
Sheer Co., H. M., Quincy, Ill.
●White Mfg. Co., St. Paul, Minn.

MOTORS, ELECTRIC, FRACTIONAL H. P.

Allis Co., Louis, Milwaukee, Wis.
●Baldor Electric Co., St. Louis, Mo.
Barber-Colman Co., Rockford, Ill. (A. C.)
Black & Decker Mfg. Co., Towson, Md.
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Erie, Pa.
Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Delco Products Corp., Dayton, O.
Diehl Mfg. Co., Elizabethport, N. J.
Duro Co., Dayton, O.
Emerson Electric Mfg. Co., St. Louis, Mo.
●General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Holtzer-Cabot Electric Co., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
Imperial Electric Co., Akron, O.
Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Master Electric Co., Dayton, O.
●Ohio Electric Mfg. Co., Cleveland, O.
●Peerless Electric Co., Warren, O.
Robbins & Myers, Inc., Springfield, O.
●Victor Electric Products, Inc., Cincinnati, O.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., Mansfield, O.

MOTORS, ELECTRIC, 1 H. P. AND OVER

Allis Co., Louis, Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
●Baldor Electric Co., St. Louis, Mo.
Brown-Brockmeyer Co., Inc., Dayton, O.
Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Crocker-Wheeler Elec. Mfg. Co., Ampere, N. J.
Delco Products Corp., Dayton, O.
Diehl Mfg. Co., Elizabethport, N. J.
Duro Co., Dayton, O.

Emerson Electric Mfg. Co., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
●General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Holtzer-Cabot Electric Co., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Lincoln Electric Co., Cleveland, O.
Master Electric Co., Dayton, O.
●Peerless Electric Co., Warren, O.
Reliance Electric & Engineering Co., Cleveland, O.
Robbins & Myers, Inc., Springfield, O.
Star Electric Motor Co., Bloomfield, N. J.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., Mansfield, O.

NAILS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.
Hassall, Inc., John, Brooklyn, N. Y.
Maze Co., W. H., Peru, Ill.
Townsend Co., New Brighton, Pa.

NAILS, COPPER

American Steel & Wire Co., Chicago, Ill.
Angell Nail & Chaplet Co., Cleveland, O.
Chase Brass & Copper Co., Waterbury, Conn.
Columbia Steel Co., San Francisco, Cal.
Copperweld Steel Co., Glassport, Pa.
Hassall, Inc., John, Brooklyn, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Maze Co., W. H., Peru, Ill.
Royal Metal Products Co., Brooklyn, N. Y.
Townsend Co., New Brighton, Pa.
Turner & Seymour Mfg. Co. Torrington Conn.

NAILS, HARDENED MASONRY

American Steel Co., Pittsburgh, Pa.
American Steel & Wire Co., Chicago, Ill.
Townsend Co., New Brighton, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.

NAILS, ROOFING

All States Roofers Equipment & Material Co., Chicago, Ill.
American Steel & Wire Co., Chicago, Ill.
Angell Nail & Chaplet Co., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Deniston Co., Chicago, Ill. (Lead Head)
Dickson Weatherproof Nail Co., Evanston, Ill. (Lead Headed)
Eagle-Picher Lead Co., Cincinnati, O.
Edwards Mfg. Co., Inc., Cincinnati, O.
Gulf States Steel Co., Birmingham, Ala.
Hassell, Inc., John, Brooklyn, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Malleable Iron Fittings Co., Branford, Conn.
Maze Co., W. H. Peru, Ill.
National Lead Co., New York City
●Republic Steel Corp., Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Townsend Co., New Brighton, Pa.
Western Blower Co., Seattle, Wash.
Wheeling Corrugating Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

NAILS, SCREW, HARDENED

National Screw & Mfg. Co., Cleveland, O.
●Parker-Kalon Corp., New York City
●Republic Steel Corp., Cleveland, O.
Townsend Co., New Brighton, Pa.

NAILS, STAINLESS STEEL

Allegheny Steel Co., Brackenridge, Pa.
Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y.
Maze Co., W. H., Peru, Ill.
●Republic Steel Corp., Cleveland, O.

NAILS, ZINC COATED

American Steel & Wire Co., Chicago, Ill.
American Zinc Products Co., Greencastle, Ind.
Angell Nail & Chaplet Co., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Gulf States Steel Co., Birmingham, Ala.
Hassall, Inc., John, Brooklyn, N. Y.
Malleable Iron Fittings Co., Branford, Conn.
Maze Co., W. H., Peru, Ill.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. (Galvanized)
Townsend Co., New Brighton, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

NOZZLES, WATER SPRAY

Aldrich Pump Co., Allentown, Pa.
American Blower Corp., Detroit, Mich.
Binks Mfg. Co., Chicago, Ill.
Bishop & Babcock Sales Co., Cleveland, O.
●Buffalo Forge Co., Buffalo, N. Y.
Cannon, Inc., James A., Kansas City, Mo.
●Clarage Fan Co., Kalamazoo, Mich.
●Detroit Lubricator Co., Detroit, Mich.
●Friez & Sons, Inc., Julien P., Baltimore, Md.
Grinnell Co., Inc., Providence, R. I.
Hubbard Co., Minneapolis, Minn.
Hudson Equipment Corp., Minneapolis, Minn.
Johnson Tool Co., Inc., East Providence, R. I.
Lewis Air Conditioners, Inc., Minneapolis, Minn.
●Marley Co., Kansas City, Mo.
Martocello & Co., Jos. A., Philadelphia, Pa.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Peterson Freezem Mfg. Co., Kansas City, Mo.
Rega Mfg. Co., Rochester, N. Y.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Supreme Electric Products Corp., Rochester, N. Y.

OFFSETS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

OIL BURNERS

See Burners, Oil

ORNAMENTS, SHEET METAL

American Sheet Metal Works, New Orleans, La.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Brasco Mfg. Co., Harvey, Ill. (Mouldings)
Edwards Mfg. Co., Inc., Cincinnati, O.
Friedley-Voshardt Co., Chicago, Ill.
Ledkote Products Co., Everett, Mass. (Stampings)
Mesker & Co., Geo. L., Evansville, Ind.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
Newman Brothers, Inc., Cincinnati, O.
Philadelphia Metal Stamping Co., Camden, N. J.
●Providence Cornice Co., Providence, R. I.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.

OZONIZERS

Corozone Air Conditioning Corp., Cleveland, O.
Electroaire Corp., Chicago, Ill.
Triox Engineering Co., St. Louis, Mo.

PAINT, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carter Paint Co., Liberty, Ind.
Certain-teed Products Corp., New York City
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, O.
Cork Import Corp., New York City
Glidden Co., Cleveland, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Chicago, Ill.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Koppers Products Co., Pittsburgh, Pa.
Lastik Products Co., Inc., Pittsburgh, Pa.
National Mfg. Corp., Tonawanda, N. Y.
Ohmlac Paint & Refining Co., Chicago, Ill.
●Pyrolite Products Co., Cleveland, O.
Reynolds Corp., New York City
Roxalin Flexible Lacquer Co., Elizabeth, N. J.
●Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Wilhelm Co., A., Reading, Pa.

PAINT, ASBESTOS

Barber Asphalt Co., Philadelphia, Pa.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carter Paint Co., Liberty, Ind.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Creo-Dipt Co., Inc., N. Tonawanda, N. Y.
Flintkote Co., New York City
Glidden Co., Cleveland, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Chicago, Ill.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Lastik Products Co., Inc., Pittsburgh, Pa.
Metropolitan Refining Co., Long Island City, N. Y.
National Mfg. Corp., Tonawanda, N. Y.
Ohmlac Paint & Refining Co., Chicago, Ill.
●Pyrolite Products Co., Cleveland, O.
Ruberoid Co., New York City
Sauereisen Cements Co., Sharpsburg, Pa.
●Tamms Silica Co., Chicago, Ill.
●Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Wilhelm Co., A., Reading, Pa.

PAINT, CONCRETE, WATERPROOFING

Barber Asphalt Co., Philadelphia, Pa.
Barrett Co., New York City.

Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Certain-teed Products Corp., New York City.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Flintkote Co., New York City.
Glidden Co., Cleveland, O.
Goodrich Co., B. F., Akron, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Chicago, Ill.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Koppers Products Co., Pittsburgh, Pa.
Lastik Products Co., Inc., Pittsburgh, Pa.
Metropolitan Refining Co., Long Island, City, N. Y.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pecora Paint Co., Philadelphia, Pa.
●Pyrolite Products Co., Cleveland, O.
Ruberoid Co., New York City.
●Tamms Silica Co., Chicago, Ill.
●Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Steel Co., Youngstown, O.
United States Gypsum Co., Chicago, Ill.
Wilhelm Co., A., Reading, Pa.

PAINT, HOT SURFACES

Barrett Co., New York City.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Co., Philip, Lockland, Cincinnati, O.
Carter Paint Co., Liberty, Ind.
Certain-teed Products Corp., New York City.
Continental Products Co., Euclid, O.
Glidden Co., Cleveland, O.
Heath & Milligan Mfg. Co., Chicago, Ill.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Metropolitan Refining Co., Long Island City, N. Y.
National Mfg. Corp., Tonawanda, N. Y.
Ohmlac Paint & Refining Co., Chicago, Ill.
●Pyrolite Products Co., Cleveland, O.
Sauereisen Cements Co., Sharpsburg, Pa.
●Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Wilhelm Co., A., Reading, Pa.

PAINT, ROOFING

Barber Asphalt Co., Philadelphia, Pa. (Asphalt)
Barrett Co., New York City. (Pitch)
Calbar Paint & Varnish Co., Philadelphia, Pa. (Metal)
Carey Co., Philip, Lockland, Cincinnati, O.
Certain-teed Products Corp., New York City.
Clinton Metallic Paint Co., Clinton, N. Y. (Red Metallic and Venetian)
Continental Products Co., Euclid, O. (All kinds)
Glidden Co., Cleveland, O.
Heath & Milligan Mfg. Co., Chicago, Ill. (All kinds)
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt)
Koppers Products Co., Pittsburgh, Pa. (Bituminous)
Lastik Products Co., Inc., Pittsburgh, Pa. (Asphalt, Tar)
Ohmlac Paint & Refining Co., Chicago, Ill. (Asphalt)
●Pyrolite Products Co., Cleveland, O. (Asbestos, Asphalt and Tar)
Ruberoid Co., New York City. (Asphalt and Tar)
Rutland Fire Clay Co., Rutland, Vt. (Asphalt)
●Thompson & Co., Pittsburgh, Pa.

PAPER, ASBESTOS

Carey Co., Philip, Lockland, Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Johns-Manville, New York City.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Ruberoid Co., New York City.
●Sall Mountain Co., Chicago, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Wilson, Inc., Grant, Chicago, Ill.

PARTS, PRESSED SHEET METAL

●American Brass Co., Waterbury, Conn.
●Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Bossert Corp., Utica, N. Y.
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Martin-Parry Corp., York, Pa.
U. S. Pressed Steel Products Co., Kalamazoo, Mich.
Youngstown Pressed Steel Co., Warren, O.

PASTE, ASBESTOS PAPER

Clark Stek-O Corp., Rochester, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Keasbey & Mattison Co., Ambler, Pa.
●Meyer & Bro. Co., F., Peoria, Ill.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Rutland Fire Clay Co., Rutland, Vt.
●Sall Mountain Co., Chicago, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
●Waterloo Register Co., Waterloo, Ia.
Wilson, Inc., Grant, Chicago, Ill.

PERFORATED METALS

See Metals, Perforated, Sheet and Plate

PIPE, CONDUCTOR

Ames Co., W. R., San Francisco, Cal.
Barnes Metal Products Co., Chicago, Ill.
●Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Decatur Iron & Steel Co., Decatur, Ala.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
●Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
Schoedinger Co., F. O., Columbus, O.
Sheet Metal Products Co., Peoria, Ill.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Tiffin Art Metal Co., Tiffin, O.
Watson Co., Inc., Jas. H., Bradley, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Woolwine Metal Products Co., Los Angeles, Cal.
York Corrugating Co., York, Pa.

PIPE, FURNACE

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.
●Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Gray Metal Products, Inc., Rochester, N. Y.
●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
●Lamneck Products, Inc., Columbus, O.
●Lennox Furnace Co., Marshalltown, Ia.
Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Martin Bros., Rochester, N. Y.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.
●Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Standard Furnace & Supply Co., Omaha, Nebr.
Tiffin Art Metal Co., Tiffin, O.
●United States Register Co., Battle Creek, Mich.
Wheeling Corrugating Co., Wheeling, W. Va.
Wilder Metal Co., Niles, O.
Williamson Heater Co., Cincinnati, O.

PIPE, SMOKE

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Airtherm Mfg. Co., St. Louis, Mo.
Berger Co., L. D., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Budke Stamping Co., Canonsburg, Pa.
Campbell Heating Co., Des Moines, Ia.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.
●Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Faultless Castings Co., Greencastle, Ind. (Cast Iron)
Galva Heater Co., Galva, Ill. (Cast Iron)

●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
●Lamneck Products, Inc., Columbus, O.
●Lennox Furnace Co., Marshalltown, Ia.
Majestic Co., Huntington, Ind.
Martin Bros., Rochester, N. Y.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Patten Co., J. V., Sycamore, Ill.
●Peerless Foundry Co., Indianapolis, Ind.
Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.
●Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rudy Furnace Co., Dowagiac, Mich.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Standard Furnace & Supply Co., Omaha, Nebr.
Sterling Foundry Co., Sterling, Ill. (Cast Iron)
Tiffin Art Metal Co., Tiffin, O.
●United States Register Co., Battle Creek, Mich.
●Waterloo Register Co., Waterloo, Ia. (Cast Iron)
Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.

PIPE, STOVE

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Co., Philadelphia, Pa.
Berger Co., L. D., Philadelphia, Pa.
Budke Stamping Co., Canonsburg, Pa.
●Chicago Metal Mfg. Co., Chicago, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Eclipse Metal Mfg. Co., Eden, N. Y.
●Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Howes Co., S. M., Charlestown, Boston, Mass.
Martin Bros., Rochester, N. Y.
●Milcor Steel Co., Milwaukee, Wis.
●Osborn Co., J. M. & L. A., Cleveland, O.
●Peerless Foundry Co., Indianapolis, Ind.
●Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
Wilder Metal Co., Niles, O.

PIPE INSULATION

See Insulation, Furnace and Pipe

PIPELESS FURNACES

See Furnaces, Warm Air, Pipeless Cast Iron, Steel

PLATES, ALLOY

Aluminum Company of America, Pittsburgh, Pa. (Aluminum)
●American Brass Co., Waterbury, Conn. (All copper alloys)
●American Rolling Mill Co., Middletown, O. (Stainless steel)
Bethlehem Steel Co., Bethlehem, Pa.
Crucible Steel Co. of America, New York City.
Gulf States Steel Co., Birmingham, Ala. (Copper, Steel)
●Republic Steel Corp., Cleveland, O. (Light gauge steel)
Youngstown Sheet & Tube Co., Youngstown, O.

PLATES, STEEL

Allegheny Steel Co., Brackenridge, Pa.
●American Rolling Mill Co., Middletown, O.
American Sheet and Tin Plate Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Co., Pittsburgh, Pa.
Columbia Steel Co., San Francisco, Cal.
Crucible Steel Co. of America, New York City
Decatur Iron & Steel Co., Decatur, Ala.
Granite City Steel Co., Granite City, Ill.
Gulf States Steel Co., Birmingham, Ala.
Ingersoll Steel & Disc Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lukens Steel Co., Coatesville, Pa.
Otis Steel Co., Cleveland, O.
●Republic Steel Corp., Cleveland, O. (Copper and stainless)
Standard Galvanizing Co., Chicago, Ill.
Wood Steel Co., Alan, Conshohocken, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PLATES, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.
Reading Iron Co., Reading, Pa.

PREFABRICATED DUCTS

See Ducts and Fittings, Prefabricated

PRESSES AND DIES

Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Toledo, O.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
●Dreis & Krump Mfg. Co., Chicago, Ill.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Henry & Wright Mfg. Co., Hartford, Conn.
McGee-Parry Machine Wks., Salt Lake City, Utah.
Minster Machine Co., Minster, O.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Perkins Machine Co., Warren, Mass.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Spun Steel Corp., Canton, O.
Zeh & Hahnemann Co., Newark, N. J.

PRESSURE REGULATING VALVES, GAS

See Valves, Gas Pressure Regulating

PROTECTORS, DOWNSPOUT

See Fittings and Accessories, Conductor

PULLEYS, FAN AND MOTOR

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
●American Foundry & Furnace Co., Bloomington, Ill.
American Pulley Co., Philadelphia, Pa.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Duro Metal Products Co., Chicago, Ill.
Goldens' Fdry. & Mach. Co., Columbus, Ga.
Jones Fdry. & Mach. Co., W. A., Chicago, Ill.
●Maurey Mfg. Corp., Chicago, Ill.
McGee-Parry Machine Wks., Salt Lake City, Utah.
Medart Co., St. Louis, Mo.
Moloch Fdry. & Mach. Co., Kaukauna, Wis.
Ohio Valley Pulley Wks., Maysville, Ky.
Pyott Fdry. & Mach. Co., Chicago, Ill.
Rockwood Mfg. Co., Indianapolis, Ind.
Rosedale Fdry. & Mach. Co., N. S., Pittsburgh, Pa.
Smith, Inc., Winfield H., Springville, N. Y.
Spun Steel Corp., Canton, O.
Steel and Tubes, Inc., Cleveland, O. (Stamping)
Wood's Sons Co., T. B., Chambersburg, Pa.

PULLEYS, FURNACE

●American Foundry & Furnace Co., Bloomington, Ill.
●Hart & Cooley Mfg. Co., Chicago, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Rosedale Fdry. & Mach. Co., N. S., Pittsburgh, Pa.
Stover Mfg. & Engine Co., Freeport, Ill.
●United States Register Co., Battle Creek, Mich.

PUMPS, DEEP-WELL

American Steam Pump Co., Battle Creek, Mich.
●Chandler Co., Cedar Rapids, Ia.
Crane Co., Chicago, Ill.
Decatur Pump Co., Decatur, Ill.
Delco Appliance Corp., Rochester, N. Y.
Deming Co., Salem, O.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Heil Co., Milwaukee, Wis.
Hudson Equipment Corp., Minneapolis, Minn.
Meier Electric & Machine Co., Indianapolis, Ind.
Pomona Pump Co., Pomona, Cal.
Roper Corp., Geo. D., Rockford, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Victor Equipment Co., Los Angeles, Cal.
Westco Pump Corp., Davenport, Ia.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, SHALLOW-WELL

●Chandler Co., Cedar Rapids, Ia.
Crane Co., Chicago, Ill.
Decatur Pump Co., Decatur, Ill.
Delco Appliance Corp., Rochester, N. Y.
Deming Co., Salem, O.
Economy Pumping Machinery Co., Inc., Chicago, Ill.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Heil Co., Milwaukee, Wis.
Hudson Equipment Corp., Minneapolis, Minn.
Meier Electric & Machine Co., Indianapolis, Ind.
Morris Machine Works, Baldwinsville, N. Y.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Victor Equipment Co., Los Angeles, Cal.
Viking Pump Co., Cedar Falls, Ia.
Westco Pump Corp., Davenport, Ia.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, WATER CIRCULATING

Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Steam Pump Co., Battle Creek, Mich.
Binks Mfg. Co., Chicago, Ill.
Buffalo Pumps, Inc., Buffalo, N. Y.
Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
De Laval Steam Turbine Co., Trenton, N. J.

Economy Pumping Machinery Co., Inc., Chicago, Ill.
Fairbanks, Morse & Co., Chicago, Ill.
Frick Co., Inc., Waynesboro, Pa.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Ingersoll-Rand, New York City.
Janette Mfg. Co., Chicago, Ill.
Lecourtenay Co., Newark, N. J.
Lewis & Co., Chas. S., St. Louis, Mo.
Morris Machine Works, Baldwinsville, N. Y.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Palmer Electric Co., Detroit, Mich.
Quimby Pump Co., Inc., Newark, N. J.
Rock River Machine Co., Inc., Janesville, Wis.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Taco Heaters, Inc., New York City.
Trimount Rotary Power Co., East Dedham, Mass.
Union Steam Pump Co., Battle Creek, Mich.
Victor Equipment Co., Los Angeles, Cal.
Viking Pump Co., Cedar Falls, Ia.
Weinman Pump Co., Columbus, O.
Westco Pump Corp., Davenport, Ia.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUNCHES AND SHEARS COMBINED

Allsteel Press Co., Inc., Chicago, Ill.
Armstrong-Blum Mfg. Co., Chicago, Ill.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
●Buffalo Forge Co., Buffalo, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
Excelsior Tool and Machine Co., East St. Louis, Ill.
G.D.S. Shearing & Punching Machine Co., New York City.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Rock River Machine Co., Inc., Janesville, Wis.
Schatz Mfg. Co., Poughkeepsie, N. Y.

PUNCHES, BENCH

Allsteel Press Co., Inc., Chicago, Ill.
Armstrong-Blum Mfg. Co., Chicago, Ill.
●Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Clough, A. W., Meriden, Conn.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Rock River Machine Co., Inc., Janesville, Wis.
Schatz Mfg. Co., Poughkeepsie, N. Y.
●Whitney Mfg. Co., W. A., Rockford, Ill.
●Whitney Metal Tool Co., Rockford, Ill.

PUNCHES, COMBINATION HAND AND BENCH

Allsteel Press Co., Inc., Chicago, Ill.
Armstrong-Blum Mfg. Co., Chicago, Ill.
Champion Blower & Forge Co., Lancaster, Pa.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.
Rock River Machine Co., Inc., Janesville, Wis.
Schatz Mfg. Co., Poughkeepsie, N. Y.
●Whitney Mfg. Co., W. A., Rockford, Ill.
●Whitney Metal Tool Co., Rockford, Ill.

PUNCHES, HAND

Allsteel Press Co., Inc., Chicago, Ill.
Armstrong-Blum Mfg. Co., Chicago, Ill.
Bertsch & Co., Cambridge City, Ind.
Bollaert, M., Oakland, Cal.
●Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Clough, A. W., Meriden, Conn.
Danzer Metal Works, Inc., Hagerstown, Md.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Johnson, Inc., William, Newark, N. J.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
●Niagara Machine & Tool Works, Buffalo, N. Y.
●Parker-Kalon Corp., New York City.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Rock River Machine Co., Inc., Janesville, Wis.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Service Machine Co., Elizabeth, N. J.
●Whitney Mfg. Co., W. A., Rockford, Ill.
●Whitney Metal Tool Co., Rockford, Ill.

PUNCHES, POWER

Allsteel Press Co., Inc., Chicago, Ill.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Toledo, O.
●Buffalo Forge Co., Buffalo, N. Y.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
Excelsior Tool and Machine Co., East St Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Henry & Wright Mfg. Co., Hartford, Conn.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Perkins Machine Co., Warren, Mass.
Rock River Machine Co., Inc., Janesville, Wis.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Service Machine Co., Elizabeth, N. J.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
●Whitney Metal Tool Co., Rockford, Ill.
Zeh & Hahnemann Co., Newark, N. J.

QUADRANTS, DAMPER

●American Foundry & Furnace Co., Bloomington, Ill.
Braden Mfg. Co., Terre Haute, Ind.
California Cornice Works, Inc., Los Angeles, Cal.
●Hart & Cooley Mfg. Co., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.
Littleford Bros., Cincinnati, O.
Ohio Products Co., Cleveland, O.
●Parker-Kalon Corp., New York City.
Schoedinger Co., F. O., Columbus, O.
Weiss & Co., H., New York City.
Young Ventilating Co., Cleveland, O.

REBUILT MACHINERY

See Machinery, Rebuilt and Used

REFRACTORIES

Chapman Clay Co., Zanesville, O.
●Fireline Stove & Furnace Lining Co., Chicago, Ill. (Plastic firepot lining).
Johns-Manville, New York City (Cement and monolithic.)
Keasbey & Mattison Co., Ambler, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo. (Fire brick & high temperature mortars)
Plibrico Jointless Firebrick Co., Chicago, Ill. (Plastic firepot lining)
●Pyrolite Products Co., Cleveland, O.

REGISTER SHIELDS

See Shields, Warm Air Register

REFRIGERATING UNITS

See Compressors, Refrigerating

REGISTERS, AIR CONDITIONING

●Auer Register Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
●Hart & Cooley Mfg. Co., Chicago, Ill.
●Independent Register & Mfg. Co., Cleveland, O.
Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
●Waterloo Register Co., Waterloo, Ia.

REGISTERS, HEATING AND VENTILATING

●American Foundry & Furnace Co., Bloomington, Ill.
●Auer Register Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bergstrom Mfg. Co., Neenah, Wis.
Best Register Co., Milwaukee, Wis.
Diamond Mfg. Co., Wyoming, Pa.
●Forest City Foundries Co., Cleveland, O.
●Hart & Cooley Mfg. Co., Chicago, Ill.
●Independent Register & Mfg. Co., Cleveland, O.
●Lamneck Products, Inc., Columbus, O.
●Liberty Foundry Co., St. Louis, Mo.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Fan & Blower Corp., Chicago, Ill.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rock Island Register Co., Rock Island, Ill.
Springman Metal Specialty Co., Detroit, Mich.
Standard Stamping & Perforating Co., Chicago, Ill.
Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
●Waterloo Register Co., Waterloo, Ia.

REGULATORS, DRAFT, SMOKE PIPE

Bailey Meter Co., Cleveland, O.
Dutcher Heating Co., Canton, Mass.
Field Mfg. Co., Chicago, Ill.
Hotentot Co., Inc., Omaha, Nebr.
Hotstream Heater Co., Cleveland, O. (Automatic)
International Draft Control Co., Cleveland, O.
Piatt Products Corp., Lansing, Mich. (6 and 9-inch)
Walker Mfg. & Sales Corp., St. Joseph, Mo.

REGULATORS, FURNACE DRAFT, MECHANICAL

●Automatic Humidifier Co., Cedar Falls, Ia.
Automatic Products Co., Milwaukee, Wis.
Bailey Meter Co., Cleveland, O.
Dutcher Heating Co., Canton, Mass.
Gleason-Avery, Inc., Auburn, N. Y.
Gold Seal Furnace Co., Minneapolis, Minn.
●Hart & Cooley Mfg. Co., Chicago, Ill.
●Hays Corp., Michigan City, Ind.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

RELAYS, ELECTRICAL

Allen-Bradley Co., Milwaukee, Wis.
Automatic Switch Co., New York City
Bender Warrick Corp., Birmingham, Mich.
Clark Controller Co., Cleveland, O.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Electric Controller & Mfg. Co., Cleveland, O.
●Friez & Sons, Inc., Julien P., Baltimore, Md.
General Controls Co., San Francisco, Cal., and Cleveland, O.
●General Electric Co., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Hart Mfg. Co., Hartford, Conn.
McCorkle Co., D. H., Berkeley, Calif.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Des Moines, Ia.
Perfex Controls Co., Milwaukee, Wis.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
●Russell Electric Co., Chicago, Ill.
Sheer Co., H. M., Quincy, Ill.
Struthers Dunn, Inc., Philadelphia, Pa.
Supreme Electric Products Corp., Rochester, N. Y.
Ward Leonard Electric Co., Mt. Vernon, N. Y.

REPAIRS, STOVE AND FURNACE

Adams Co., Dubuque, Ia.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
●Brauer Supply Co., A. G., St. Louis, Mo.
●Capitol Furnace & Stove Repair Co., Indianapolis, Ind.
●Central Furnace & Stove Repair Co., St., Louis, Mo.
Cincinnati Stamping Co., Cincinnati, O.
Detroit Michigan Stove Co., Detroit, Mich.
Dornback Furnace & Foundry Co., Cleveland, O.
Edwards Furnace Co., Wellsboro, Pa.
Faultless Heater Corp., Cleveland, O.
●Forest City Foundries Co., Cleveland, O.
●Henry Furnace & Foundry Co., Cleveland, O.
Keith Furnace Co., Des Moines, Ia.
Marshall Furnace Co., Marshall, Mich.
●Metzner Stove Repair Co., Kansas City, Mo.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●National Foundry & Furnace Co., Dayton, O.
●Northwestern Stove Repair Co., Chicago, Ill.
●Peerless Foundry Co., Indianapolis, Ind.
●Round Oak Co., Dowagiac, Mich.
Security Stove & Mfg. Co., Kansas City, Mo.
●Standard Foundry & Furnace Co., De Kalb, Ill.
Stiglitz Furnace & Foundry Co., Louisville, Ky.
Wayne Pattern & Foundry Co., Fort Wayne, Ind.
Williamson Heater Co., Cincinnati, O.

RIDGE ROLLS AND RIDGING

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Ames Co., W. R., San Francisco, Cal.
Barnes Metal Products Co., Chicago, Ill.
●Berger Bros. Co., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Decatur Iron & Steel Co., Decatur, Ala.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Edwards Mfg. Co., Inc., Cincinnati, O.
●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
Inland Steel Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
New Delphos Mfg. Co., Delphos, O.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
●Providence Cornice Co., Providence, R. I.
Reeves Mfg. Co., Dover, O.
●Republic Steel Corp., Cleveland, O.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
Schoedinger Co., F. O., Columbus, O.
Tiffin Art Metal Co., Tiffin, O.
Van Noorden Co., E., Boston, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.
Woolwine Metal Products Co., Los Angeles, Cal.
Youngstown Sheet & Tube Co., Youngstown, O.

RINGS, HANGER, BLOW PIPE

See Fittings, Blow Pipe

RIVETS, ALLOY

Allegheny Steel Co., Brackenridge, Pa. (Stainless)
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Millidale, Conn.
Duriron Co., Inc., Dayton, O. (Steel, chromium-nickel)
●Republic Steel Corp., Cleveland, O. (Stainless steel and steel)
Townsend Co., New Brighton, Pa.

RIVETS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.
Bridgeport Screw Co., Bridgeport, Conn.
Hassall, Inc., John, Brooklyn, N. Y.
Townsend Co., New Brighton, Pa.

RIVETS, BRASS, COPPER AND IRON

●American Brass Co., Waterbury, Conn.
Atlas Bolt & Screw Co., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Screw Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hassall, Inc., John, Brooklyn, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Inland Steel Co., Chicago, Ill.
National Screw & Mfg. Co., Cleveland, O.
●Revere Copper & Brass, Inc., New York City.
Townsend Co., New Brighton, Pa.

ROD, WELDING

Air Reduction Sales Co., New York City
Allegheny Steel Co., Brackenridge, Pa. (Stainless)
Aluminum Company of America, Pittsburgh, Pa. (Aluminum)
●American Brass Co., Waterbury, Conn.
American Chain Co., Inc., Bridgeport, Conn.
American Steel Co., Pittsburgh, Pa.
American Steel & Wire Co., Chicago, Ill.
Bridgeport Brass Co., Bridgeport, Conn.
Central Steel & Wire Co., Chicago, Ill.
Chicago Steel & Wire Co., Chicago, Ill.
Crucible Steel Co. of America, New York City
Gulf States Steel Co., Birmingham, Ala.
Handy & Harmon, New York City
Imperial Brass Mfg. Co., Chicago, Ill.
●International Nickel Co., Inc., New York City (Monel Metal)
Linde Air Products Co., New York City.
Milburn Co., Alexander, Baltimore, Md.
Page Steel & Wire Co., Monessen, Pa. (Stainless Steel)
●Revere Copper & Brass, Inc., New York City
Sight Feed Generator Co., Richmond, Ind.
Torchweld Equipment Co., Chicago, Ill.
Uno Welding, Inc., Cleveland, O.
Welding Service Sales, Inc., San Francisco, Cal.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
●Wickwire Spencer Steel Co., New York City
Youngstown Sheet & Tube Co., Youngstown, O.

ROLLS (HAND AND POWER), FORMING, BENDING

Bertsch & Co., Cambridge City, Ind.
Hendley & Whittemore Co., Beloit, Wis.
●Maplewood Machinery Co., Inc., Chicago, Ill.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.

ROOFING, ALUMINUM

Fingles, Inc., W. A., Baltimore, Md.
Southern States Iron Rfg. Co., Savannah, Ga.
Van Noorden Co., E., Boston, Mass.

ROOFING, BUILT-UP

●American Brass Co., Waterbury, Conn.
Barber Asphalt Co., Philadelphia, Pa.
Barrett Co., New York City
Bird & Son, Inc., East Walpole, Mass.
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Lockland, Cincinnati, O.
Certain-teed Products Corp., New York City
Flintkote Co., New York City
Johns-Manville, New York City
Koppers Products Co., Pittsburgh, Pa. (Pitch and Felt)
Logan-Long Co., Chicago, Ill.
National Mfg. Corp., Tonawanda, N. Y.
Reilly Tar & Chemical Co., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh, Pa.
Ruberoid Co., New York City.
United States Gypsum Co., Chicago, Ill.

ROOFING, COPPER

●American Brass Co., Waterbury, Conn.
Braden Mfg. Co., Terre Haute, Ind.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Danzer Metal Works, Inc., Hagerstown, Md.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Edwards Mfg. Co., Inc., Cincinnati, O. (Metal Shingles, Spanish Tile)
Fingles, Inc., W. A., Baltimore, Md.
●Hussey & Co., C. G., Pittsburgh, Pa.
●Milcor Steel Co., Milwaukee, Wis.
●Revere Copper & Brass, Inc., New York City
Tiffin Art Metal Co., Tiffin, O.
Wheeling Corrugating Co., Wheeling, W. Va. (Cop-R-Loy)
Wheeling Metal & Mfg. Co., Wheeling, W. Va.

ROOFING, IRON AND STEEL

●American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.

Ames Co., W. R., San Francisco, Cal.
Apollo Steel Co., Apollo, Pa.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
Bethlehem Steel Co., Bethlehem, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
Byers Co., A. M., Pittsburgh, Pa. (Wrought Iron)
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Columbia Steel Co., San Francisco, Cal. (Steel)
Danzer Metal Works, Inc., Hagerstown, Md.
Decatur Iron & Steel Co., Decatur, Ala.
Edwards Mfg. Co., Inc., Cincinnati, O.
Fingles, Inc., W. A., Baltimore, Md.
Globe Iron Roofing & Corrugating Co., Cincinnati, O.
Gulf States Steel Co., Birmingham, Ala.
Inland Steel Co., Chicago, Ill. (Steel)
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
New Delphos Mfg. Co., Delphos, O.
●Newport Rolling Mill Co., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Reeves Mfg. Co., Dover, O.
●Republic Steel Corp., Cleveland, O.
Robertson Co., H. H., Pittsburgh, Pa.
St. Paul Corrugating Co., St. Paul, Minn.
Southern States Iron Rfg. Co., Savannah, Ga.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. (Steel)
Tiffin Art Metal Co., Tiffin, O.
Truscon Steel Co., Youngstown, O.
Van Noorden Co., E., Boston, Mass.
Weirton Steel Co., Weirton, W. Va. (Galvanized)
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING, LEAD

Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Fingles, Inc., W. A., Baltimore, Md.
National Lead Co., New York City
Rochester Lead Works, Rochester, N. Y.

ROOFING PAINT

See Paint, Roofing

ROOFING, SLATE

Bangor-Washington Slate Co., Bangor, Pa.
Chapman Slate Co., Bethlehem, Pa.
Jackson-Bangor Slate Co., Pen Argyl, Pa.
North Bangor Slate Co., Bangor, Pa.
Rising & Nelson Slate Co., West Pawlet, Vt.
Sheldon Slate Co., F. C., Granville, N. Y.
Structural Slate Co., Pen Argyl, Pa.
United States Gypsum Co., Chicago, Ill.
Vendor Slate Co., Inc., Nazareth, Pa.
Vermont Structural Slate Co., Fair Haven, Vt.

ROOFING, TILE (CLAY & CONCRETE)

Hood Co., B. Mifflin, Daisy, Tenn. (Clay)
Ludowici-Celadon Co., Chicago, Ill.
Murray Tile Co., Cloverport, Ky.
National Fireproofing Corp., Pittsburgh, Pa.

ROOFING, TIN

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Follansbee Brothers Co., Pittsburgh, Pa.
Southern States Iron Rfg. Co., Savannah, Ga.
Weirton Steel Co., Weirton, W. Va.
Wheeling Corrugating Co., Wheeling, W. Va.

ROOFING, ZINC

American Zinc Products Co., Greencastle, Ind.
Barnes Metal Products Co., Chicago, Ill.
Braden Mfg. Co., Terre Haute, Ind.
Illinois Zinc Co., Peru, Ill.
Southern States Iron Rfg. Co., Savannah, Ga.
Van Noorden Co., E., Boston, Mass.
Wheeling Corrugating Co., Wheeling, W. Va. (Coated)

ROOM COOLERS

See Coolers, Room, Ice, Portable

SAVERS, HEAT

Bedard Mfg. Co., Minneapolis, Minn. (Smoke Pipe)
Cary Mfg. Co., Waupaca, Wis.
Chinook, Inc., St. Paul Minn.
Crown Fuel Saver Co., Richmond, Ind.
Gerhardt, W. F., Richmond, Va.
Heat Control Corp., Milwaukee, Wis.
Meyers Fuel Saver Co., Inc., Janesville, Wis.
Roberts-Hamilton Co., Minneapolis, Minn.
Wolff Coal Saver Co., Chicago, Ill.
Woolery Machine Co., Minneapolis, Minn.

SCREWS, DRIVE

American Screw Co., Providence, R. I.
Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y. (Stainless Steel)
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Deniston Co., Chicago, Ill. (Lead Head)
Hassall, Inc., John, Brooklyn, N. Y.
National Screw & Mfg. Co., Cleveland, O.
●Parker-Kalon Corp., New York City (Hardened Metallic)
Turner & Seymour Mfg. Co., Torrington, Con.

SCREWS, SELF-TAPPING

Continental Screw Co., New Bedford, Mass.
National Screw & Mfg. Co., Cleveland, O.
●Parker-Kalon Corp., New York City.

SCREWS, SHEET METAL

Allegheny Steel Co., Brackenridge, Pa. (Stainless)
American Screw Co, Providence, R. I.
Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y. (Stainless Steel)
Continental Screw Co., New Bedford, Mass.
Hassall, Inc., John, Brooklyn, N. Y.
National Screw & Mfg. Co., Cleveland, O.
●Parker-Kalon Corp., New York City
Watson Co., Inc., Jas. H., Bradley, Ill.

SHALLOW WELL PUMPS

See Pumps, Shallow Well

SHAPES, STRUCTURAL

See Angles, Bars, Beams, Channels and Tees (Structural Shapes)

SHEARS, HAND AND BENCH

See Snips and Shears, Bench and Hand

SHEARS AND PUNCHES COMBINED

See Punches and Shears Combined

SHEARS, PORTABLE, ELECTRIC

●Stanley Works, New Britain, Conn.

SHEARS, POWER

Allsteel Press Co., Inc., Chicago, Ill.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Toledo, O.
●Buffalo Forge Co., Buffalo, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
●Dreis & Krump Mfg. Co., Chicago, Ill.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Marshalltown Mfg. Co., Marshalltown, Ia.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City
Quickwork Co., St. Marys, O.
Rock River Machine Co., Inc., Janesville, Wis.
Yoder Co., Cleveland, O.

SHEET METAL ORNAMENTS

See Ornaments, Sheet Metal

SHEET METAL PARTS

See Parts, Pressed Sheet Metal

SHEETS, ALLOY

Allegheny Steel Co., Brackenridge, Pa. (Stainless)
●American Brass Co., Waterbury, Conn. (Copper Alloys)
●American Rolling Mill Co., Middletown, O. (Stainless Steel)
American Sheet & Tin Plate Co., Pittsburgh, Pa. (Copper, High Finish and Stainless Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Crucible Steel Co. of America, New York City
Duriron Co., Inc., Dayton, O. (Chromium-Nickel)
Inland Steel Co., Chicago, Ill.
●International Nickel Co., Inc., New York City (Monel Metal)
●Newport Rolling Mill Co., Newport, Ky. (Pure Iron-Copper Alloy)
●Republic Steel Corp., Cleveland, O. (Steel)
Superior Sheet Steel Co., Canton, O. (White Polished)
Wheeling Steel Corp., Wheeling, W. Va. (Cop-R-Loy)
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.
Fairmont Aluminum Co., Fairmont, W. Va.

SHEETS, CLAD

Allegheny Steel Co., Brackenridge, Pa.
Crucible Steel Co. of America, New York City.
●International Nickel Co., Inc., New York City (Nickel Clad)

SHEETS, COPPER

●American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill.

Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
●Hussey & Co., C. G., Pittsburgh, Pa.
National Brass & Copper Co., Inc., Pittsburgh, Pa.
New Haven Copper Co., Seymour, Conn.
●Revere Copper & Brass, Inc., New York City
U. S. Brass & Copper Co., Hyde Park, Mass.

SHEETS, COPPER BEARING STEEL

●American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Apollo Steel Co., Apollo, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Cal.
Globe Iron Roofing & Corrugating Co., Cincinnati, O.
Granite City Steel Co., Granite City, Ill.
Gulf States Steel Co., Birmingham, Ala.
Inland Steel Co., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Mahoning Valley Steel Co., Niles, O.
New Delphos Mfg. Co., Delphos, O. (Galvanized Steel)
●Newport Rolling Mill Co., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Otis Steel Co., Cleveland, O.
●Republic Steel Corp., Cleveland, O.
Superior Sheet Steel Co., Canton, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, COPPER, LEAD COATED

●American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
●Hussey & Co., C. G., Pittsburgh, Pa.
Ledkote Products Co., Everett, Mass.
National Brass & Copper Co., Inc., Pittsburgh, Pa.
●Revere Copper & Brass, Inc., New York City
●U. S. Brass & Copper Co., Hyde Park, Mass.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.

SHEETS, GALVANNEALED

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Budke Stamping Co., Canonsburg, Pa.
Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
●Newport Rolling Mill Co., Newport, Ky.
●Republic Steel Corp., Cleveland, O.
Superior Sheet Steel Co., Canton, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, LEAD

Andrews Lead Co., Long Island City, N. Y.
Eagle Picher Lead Co., Cincinnati, O.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., 4820 S. Campbell Ave., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York City
Rochester Lead Works, Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

SHEETS, SPECIAL METAL

(Nickel Zinc, Chrome Zinc, Nickel Coated Copper, Chromium Coated Copper, Nickel Coated Steel, Chromium Coated Steel, Chromium Coated Nickel Silver, Zinc Brass, Zinc Copper, etc.)

American Nickeloid Co., Peru, Ill.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
●Hussey & Co., C. G., Pittsburgh, Pa.
Ingersoll Steel & Disc Co., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
National Sheet Metal Co., Peru, Ill.
●Revere Copper & Brass, Inc., New York City
Wilder Metal Co., Niles, O.

SHEETS, STAINLESS STEEL

Allegheny Steel Co., Brackenridge, Pa. (Allegheny Metal)
●American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Cal. (Two-Ply)
Crucible Steel Co. of America, New York City (Two-Ply)
Ingersoll Steel & Disc Co., Chicago, Ill. (Two-Ply)
●International Nickel Co., New York City (Monel Metal)
Jessop Steel Co., Washington, Pa.
Ludlum Steel Co., Watervliet, N. Y.
●Republic Steel Corp., Youngstown, O.
Rustless Iron Corp. of America, Baltimore, Md.
Universal Steel Co., Bridgeville, Pa.

SHEETS, STEEL

(Polished and Blue, Corrugated and Plain, Black, Terne and Galvanized)

Allegheny Steel Co., Brackenridge, Pa.
American Flange & Mfg. Co., Inc., New York City.
●American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Apollo Steel Co., Apollo, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Budke Stamping Co., Canonsburg, Pa.
Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Edwards Mfg. Co., Inc., Cincinnati, O.
Empire Sheet & Tin Plate Co., Mansfield, O.
Follansbee Brothers Co., Pittsburgh, Pa.
Fuller-Warren Co., Milwaukee, Wis. (Porcelain Enameled)
Globe Iron Roofing & Corrugating Co., Cincinnati, O.
Granite City Steel Co., Granite City, Ill.
Gulf States Steel Co., Birmingham, Ala.
Inland Steel Co., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Mahoning Valley Steel Co., Niles, O.
National Steel Corp., Pittsburgh, Pa.
●Newport Rolling Mill Co., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Reading Iron Co., Philadelphia, Pa. (Genuine Wrought Iron)
●Republic Steel Corp., Cleveland, O.
Superior Sheet Steel Co., Canton, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, TIN

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Empire Sheet & Tin Plate Co., Mansfield, O.
Follansbee Brothers Co., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Rochester Lead Works, Inc., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill.
American Zinc Products Co., Greencastle, Ind.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Illinois Zinc Co., Peru, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York City
Wheeling Steel Corp., Wheeling, W. Va. (Coated)

SHIELDS, WARM AIR REGISTER

Gammeter Co., W. F., Cadiz, O. (with Humidifier)
Hum-O-Zone Co., Horicon, Wis.
Pentecost & Craft Co., Terre Haute, Ind.
Schoedinger, F. O., Co., Columbus, O.
Somers, Inc., H. J., Detroit, Mich.

SHINGLES AND TILE, METAL

Ames Co., W. R., San Francisco, Cal.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Columbian Enameling & Stamping Co., Terre Haute, Ind.
Edwards Mfg. Co., Inc., Cincinnati, O.
Fingles, Inc., W. A., Baltimore, Md.
Globe Iron Roofing & Corrugating Co., Cincinnati, O.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
New Haven Copper Co., Seymour, Conn. (Copper)
●Newport Rolling Mill Co., Newport, Ky.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
St. Paul Corrugating Co., St. Paul, Minn.
Southern States Iron Roofing Co., Savanna, Ga.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.

SKYLIGHTS

American Sheet Metal Works, New Orleans, La.
Anderson Mfg. Co., Des Moines, Ia.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
Berger Co., L. D., Philadelphia, Pa.
Biersach & Niedermeyer Co., Milwaukee, Wis.
California Cornice Works, Inc., Los Angeles, Cal.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Danzer Metal Works, Inc., Hagerstown, Md.
Decatur Iron & Steel Co., Decatur, Ala.
Drouve Co., G., Fairfield Conn.
Edwards Mfg. Co., Inc., Cincinnati, O.
Falstrom Co., Passaic, N. J.
Fingles, Inc., W. A., Baltimore, Md.
General Sheet Metal Works, Inc., Bridgeport, Conn.
Goethel Co., Alfred C., Milwaukee, Wis.
Herrmann & Grace Co., Brooklyn, N. Y.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Hudson Equipment Corp., Minneapolis, Minn.
International Steel Co., Evansville, Ind.
Klauer Mfg. Co., Dubuque, Ia.
Lee & Son Co., Thomas, Cincinnati, O.
Martin Metal Mfg. Co., Wichita, Kan.

Midwest Aluminum Products, Inc., Milwaukee, Wis.
Midwest Ventilating Works, Milwaukee, Wis.
●Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Park City Cornice Works, Inc., Bridgeport, Conn.
Perkinson & Brown, Chicago, Ill.
●Providence Cornice Co., Providence, R. I.
Robertson Co., H. H., Pittsburgh, Pa.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Van Noorden Co., E., Boston, Mass.
Vent-O-Lite Co., Chicago, Ill. (Ventitlating)
Ward Co., H. H., Chester, Pa.
Watson Co., Inc., Jas. H., Bradley, Ill.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

SKYLIGHT LIFTS

See Lifts, Skylight

SMOKE PIPE

See Pipe, Smoke

SMOKE PIPE DAMPERS

See Dampers, Smoke Pipe

SMOKE PIPE FITTINGS

See Fittings and Accessories, Smoke Pipe

SNIPS AND SHEARS, BENCH AND HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bartlett Mfg. Co., Detroit, Mich.
Beverly Throatless Shear Co., Chicago, Ill.
Clauss Shear Co., Fremont, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Pels & Co., Inc., Henry, New York City
Rupp Forge & Shear Co., Cleveland, O.
●Viking Shear Co., Erie, Pa.
Weiss & Co., H., New York City
Wiss & Sons Co., J., Newark, N. J.

SOLDER

Alumaweld Co. of America, Chicago, Ill.
●American Brass Co., Waterbury, Conn.
Downs-Smith Brass & Copper Co., Long Island City, N. Y.
Eagle-Picher Lead Co., Cincinnati, O. (Bar and Wire)
Empire Metal Co., Syracuse, N. Y.
Gardiner Metal Co., Chicago, Ill.
Handy & Harmon, New York City
Johnston Tin Foil & Metal Co., St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island, City, N. Y.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
Merchant & Evans Co., Philadelphia, Pa.
National Lead Co., New York City
New Delphos Mfg. Co., Delphos, O.
●Ruby Chemical Co., Columbus, O. (Acid and Rosin Core)
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Wagner, C. DeWitt, Cedar Rapids, Ia. (Aluminum)

SOLDERING COPPERS

See Coppers, Soldering

SOLDERING FLUX

See Flux, Soldering

SOLDERING FURNACES

See Furnaces, Soldering

SOLDERING IRONS

See Coppers, Soldering

SOLDERING TORCHES

See Torches, Soldering

SOLENOID VALVES

See Valves, Solenoid

SPOT WELDERS

See Welders, Arc, Spot, Oxy-Acetylene

SPOT WELDERS

See Welders, Spot

SPRAY NOZZLES

See Nozzles, Water Spray

STEEL CEILINGS

See Ceilings, Metal

STOKERS, DOMESTIC

Advance Appliance Co., Peoria, Ill.
Anchor Stove & Range Co., New Albany, Ind.
Apex Tool Co., Inc., Bridgeport, Conn.
Athens Plow Co., Athens, Tenn.
Auburn Stoker Co., Auburn, Ind.
Automatic Stoker Corp., Indianapolis, Ind.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Beckley Perforating Co., Garwood, N. J.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
Burnwell Corp., Allentown, Pa.
Butler Mfg. Co., Kansas City, Mo.
Christensen Machine Co., Salt Lake City, Utah
Columbus Metal Products Inc., Columbus, O.
Combustioneer, Inc., Springfield, O.
Econocol Stoker Co., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Electric Furnace-Man., Inc., New York City
Electro-Stoke Mfg. Co., Indianapolis, Ind,
Fairbanks, Morse & Co., Chicago, Ill.
Finnell Rotary Stokers, Inc., Elkhart, Ind.
Free-Man Stoker & Eng., Co., Chicago, Ill.
Fuel Savers, Inc., Harrisburg, Pa.
Furnaceslave, Inc., Indianapolis, Ind.
Gehl Bros. Mfg. Co., West Bend, Wis.
Germer Stove Co., Erie, Pa.
Hamilton Automatic Stoker Corp., Hamilton, O.
Heating Assurance, Inc., Spokane, Wash.
Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Illinois Iron & Bolt Co., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Jacobson Machine Works, Inc., A. E., Minneapolis, Minn.
Leach Co., Oshkosh, Wis.
Liberty Coal Burner Co., St. Louis, Mo.
Link Belt Co., Chicago, Ill.
Miami Foundry Co., Miamisburg, O.
Model Mfg. Co., Richmond, Va.
Moloch Foundry & Machine Co., Kaukauna, Wis.
Morrissey & Co., Chicago, Ill.
Muncie Gear Works, Inc., Muncie, Ind.
National Steam Pump Co., Upper Sandusky, O.
Nelson Corp., Herman, Moline, Ill.
Ormsby-Gray Combustion Service, Inc., St. Louis, Mo.
Paragon Kol-Master Corp., Oregon, Ill.
Perfectaire Corp., Baltimore, Md.
Plymouth Industries, Inc., Plymouth, Ind.
Racine Stoker Mfg. Co., Racine, Wis.
Redi-Automatic Coal Burners, Inc., Spokane, Wash.
Sampsel-Mastoker Co., Lafayette, Ind.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Sinker-Davis Co., Indianapolis, Ind.
Sto-Coke, Inc., Indianapolis, Ind.
Stok-A-Fire Co., St. Louis, Mo.
Stoker Equipment Co., Sidney, O.
Stoker-Matic Corp., Salt Lake City, Utah
Stoker Products, Inc., Decatur, Ill.
Taylor Equipment Co., Cincinnati, O.
Union Metal Mfg. Co., Canton, O.
Whiting Corp., Harvey, Ill.
●Will-Burt Co., Orrville, O.

STOKERS, INDUSTRIAL AND COMMERCIAL

American Engineering Co., Philadelphia, Pa.
Anchor Stove & Range Co., New Albany, Ind.
Auburn Stoker Co., Auburn, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
Butler Mfg. Co., Kansas City, Mo.
Canton Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Christensen Machine Co., Salt Lake City, Utah
Columbus Metal Products, Inc., Columbus, O.
Combustion Engineering Co., Inc., New York City
Combustioneer, Inc., Springfield, O.
Delta Stoker Co., North Chicago, Ill.
Detroit Stoker Co., Detroit, Mich.
Diamond Castings Co., DuBois, Pa.
Econocol Stoker Co., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Electric Furnace-Man, Inc., New York City. (Small)
Electro-Stoke Mfg. Co., Indianapolis, Ind.
Fairbanks, Morse & Co., Chicago, Ill.
Flynn & Emrich Co., Baltimore, Md.
Frederick Iron & Steel Co., Frederick, Md.
Free-Man Stoker & Eng. Co., Chicago, Ill.
Fuel Savers, Inc., Harrisburg, Pa.
Gehl Bros. Mfg. Co., West Bend, Wis.
Hamilton Automatic Stoker Corp., Hamilton, O.
Hare Stoker Corp., Detroit, Mich.
Heating Assurance, Inc., Spokane, Wash.
Her-Born Eng. & Mfg. Co., Sandusky, O.
Hershey-Motorstoker Corp., New York City
Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Illinois Iron & Bolt Co., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Jacobson Machine Works, Inc., A. E., Minneapolis, Minn.
Johnston & Jennings Co., Cleveland, O.
●Jordan & Co., Paul R., Indianapolis, Ind.
Leach Co., Oshkosh, Wis.

Link Belt Co., Chicago, Ill.
McClave-Brooks Co., Scranton, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
Model Mfg. Co., Richmond, Va.
Moloch Foundry & Machine Co., Kaukauna, Wis.
Morrissey & Co., Chicago, Ill.
National Steam Pump Co., Upper Sandusky, O.
Neemes Foundry, Inc., Troy, N. Y.
Ormsby-Gray Combustion Service, Inc., St. Louis, Mo.
Over-Spred Stoker Co., Ottawa, Ill.
Patterson Foundry & Machine Co., East Liverpool, O.
Perfectaire Corp., Baltimore, Md.
Perfection Grate & Stoker Co., Springfield, Mass.
Plymouth Industries, Inc., Plymouth, Ind.
Redi-Automatic Coal Burners, Inc., Spokane, Wash.
Rosedale Fdry. & Mach. Co., N. S., Pittsburgh, Pa.
Sampsel-Mastoker Co., Lafayette, Ind.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Stok-A-Fire Co., St. Louis, Mo.
Stoker Products, Inc., Decatur, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Whiting Corp., Harvey, Ill.
●Will-Burt Co., Orrville, O.

STOVE PIPE

See Pipe, Stove

STRAINERS, CONDUCTOR

See Fittings and Accessories, Conductor

STRAPS, LEADER

See Fittings and Accessories, Conductor

STRUCTURAL SHAPES

See Angles, Bars, Beams, Channels and Tees (Structural Shapes)

SWITCHES, MAGNETIC

Allen-Bradley Co., Milwaukee, Wis.
Automatic Reclosing Circuit Breaker Co., Columbus, O.
Automatic Switch Co., New York City
Barber-Colman Co., Rockford, Ill.
Bender Warrick Corp., Birmingham, Mich.
Clark Controller Co., Cleveland, O.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Electric Controller & Mfg. Co., Cleveland, O.
Hart Mfg. Co., Hartford, Conn. (Mercury Tube)
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Des Moines, Ia.
Perfex Controls Co., Milwaukee, Wis.
Struthers Dunn, Inc., Philadelphia, Pa.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric & Mfg. Co., Mansfield, O.

SWITCHES, MANUAL

Allen-Bradley Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
Bender Warrick Corp., Birmingham, Mich.
Electric Controller & Mfg. Co., Cleveland, O.
Trumbull Electric Mfg. Co., Plainville, Conn.
Westinghouse Electric & Mfg. Co., Mansfield, O.

SWITCHES, TIME

Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
●Mercoid Corp., Chicago, Ill.
Paragon Electric Co., Chicago, Ill.
Penn Electric Switch Co., Des Moines, Ia.
Rhodes, Inc., M. H., New York City.
Sangamo Electric Co., Springfield, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Stat-Amatic Instrument & Appliance Co., Hartford, Conn.
Struthers Dunn, Inc., Philadelphia, Pa.
●Tork Clock Co., Inc., New York City.
Ward Leonard Electric Co., Mt. Vernon, N. Y.

TEES, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

TEMPERATURE CONTROLS

See Thermostats

TEMPERATURE CONTROLS

See Thermostats

TINPLATE

See Sheets, Tin

TIPS, DAMPER

See Clips and Tips, Damper

THERMOSTATS

Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
●Barber Gas Burner Co., Cleveland, O.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
●Friez & Sons, Inc., Julien P., Baltimore, Md.
General Controls Co., San Francisco, Cal. and Cleveland, O.
Gleason-Avery, Inc., Auburn, N. Y.
Johnson Service Co., Milwaukee, Wis.
Hart Mfg. Co., Hartford, Conn. (Direct Break).
McCorkle Co., D. H., Berkeley, Calif.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Des Moines, Ia.
Perfex Controls Co., Milwaukee, Wis.
Robertshaw-Thermostat Co., Youngwood, Pa.
●Russell Electric Co., Chicago, Ill.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Stat-Amatic Instrument & Appliance Co., Hartford, Conn.
Supreme Electric Products Corp., Rochester, N. Y.
Tagliabue Mfg. Co., Brooklyn, N. Y.
United Electric Controls Co., South Boston, Mass.
●White Mfg. Co., St. Paul, Minn.

THROUGH WALL FLASHINGS

See Flashings, Through Wall

TIME SWITCHES

See Switches, Time

TINNING FLUXES

See Compounds, Tinning

TOOLS, METAL WORKERS'

Champion Tool Co., Los Angeles, Cal.
Crescent Tool Co., Jamestown, N. Y.
Miller Rubber Products Co., Inc., Akron, O.
National Machine Tool Co., Racine, Wis.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pencilsharp Awl & Tool Co., Evansville, Ind. (Scratch Awls)
Rock River Machine Co., Inc., Janesville, Wis.
●Stanley Works, New Britain, Conn.
●Whitney Metal Tool Co., Rockford, Ill.
●Whitney Mfg. Co., W. A., Rockford, Ill.

TOOLS, ROOFERS'

Aeroil Burner Co., Inc., West New York, N. J. (Military Pots)
Elermann Floor Scraper Co., Brooklyn, N. Y. (Tar)
Littleford Bros., Cincinnati, O.
●Milcor Steel Co., Milwaukee, Wis.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pencilsharp Awl & Tool Co., Evansville, Ind.
Southbridge Roofing Co., Inc., Southbridge, Mass.

TOPS, CHIMNEY

See Caps and Tops, Chimney

TORCHES, BRAZING, CUTTING, WELDING, OXY-ACETYLENE

Air Reduction Sales Co., New York City
Bastian-Blessing Co., Chicago, Ill.
Bernz Co., Inc., Otto, Rochester, N. Y. (Brazing)
Burdett Mfg. Co., Chicago, Ill.
Eisler Electric Corp., Newark, N. J.
Gasweld & Airway, Inc., Chicago, Ill.
Harris Calorific Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Linde Air Products Co., New York City
Milburn Co., Alexander, Baltimore, Md.
Miller Equipment Co., Cincinnati, O.
Sight Feed Generator Co., Richmond, Ind.
Torchweld Equipment Co., Chicago, Ill.

TORCHES, SOLDERING

Bernz Co., Inc., Otto, Rochester, N. Y.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Detroit Torch & Mfg. Co., Detroit, Mich.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Everhot Mfg. Co., Maywood, Ill.
Gasweld & Airway, Inc., Chicago, Ill.
Harris Calorific Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Milburn Co., Alexander, Baltimore, Md.
Miller Equipment Co., Cincinnati, O.
Red Devil Mfg. Co., Palatine, Ill.
Sight Feed Generator Co., Richmond, Ind.
Torchweld Equipment Co., Chicago, Ill.
Turner Brass Works, Sycamore, Ill.
Wall Mfg. Supply Co., P., Pittsburgh, Pa.

TRANSFORMERS, LOW VOLTAGE

Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Jefferson Electric Co., Bellwood, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Russell Electric Co., Chicago, Ill.
Taylor-Winfield Corp., Warren, O.
Wagner Electric Corp., St. Louis, Mo.
●White Mfg. Co., St. Paul, Minn.

TRANSMISSION DRIVES

See Belts and Pulleys

UNITS, AIR CONDITIONING

See Air Conditioning Units

VACUUM CLEANERS FOR FURNACES

See Cleaners, Furnace, Vacuum

TUBING, COPPER

●American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
●Hussey & Co., C. G., Pittsburgh, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
●Revere Copper & Brass, Inc., New York City.
Streamline Pipe & Fittings Co., Port Huron, Mich.
Wolverine Tube Co., Detroit, Mich.

VALVES, GAS PRESSURE REGULATING

Atlas Valve Co., Newark, N. J.
●Barber Gas Burner Co., Cleveland, O.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Co., Cleveland, O.
●Detroit Lubricator Co., Detroit, Mich.
Fisher Governor Co., Marshalltown, Ia.
Fox Engineering Co., Boston, Mass.
General Controls Co., San Francisco, Cal., and Cleveland, O.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.

VALVES, SOLENOID

Alco Valve Co., Inc., St. Louis, Mo.
Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., New York City
Barber-Colman Co., Rockford, Ill.
●Barber Gas Burner Co., Cleveland, O.
Bryant Heater Co., Cleveland, O.
Clark Controller Co., Cleveland, O.
●Columbus Humidifier Co., Columbus, O. (One-inch water)
Cutler-Hammer, Inc., Milwaukee, Wis.
●Detroit Lubricator Co., Detroit, Mich.
Electric Valve Mfg. Co., Inc., New York City
Frick Co., Inc., Waynesboro, Pa.
General Controls Co., San Francisco, Cal., and Cleveland, O.
●General Electric Co., Schenectady, N. Y.
McCorkle Co., D. H., Berkeley, Cal.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfex Controls Co., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
●Russell Electric Co., Chicago, Ill.
Supreme Electric Products Corp., Rochester, N. Y.

VENTILATING FANS

See Fans, Ventilating

VENTILATORS, CEILING

Airmaster Corp., Chicago, Ill.
American Blower Corp., Detroit, Mich.
●Auer Register Co., Cleveland, O.
Best Register Co., Milwaukee, Wis.
Burt Mfg. Co., Akron, O.
Champion Blower & Forge Co., Lancaster, Pa.
Danzer Metal Works, Inc., Hagerstown, Md.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hudson Equipment Corp., Minneapolis, Minn.
●Lamneck Products, Inc., Columbus, O.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Tiffin Art Metal Co., Tiffin, O.
Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
●Waterloo Register Co., Waterloo, Ia.

VENTILATORS, MUSHROOM

●Aeolus Dickinson, Chicago, Ill.
American Blower Corp., Detroit, Mich.
Best Register Co., Milwaukee, Wis.
Burt Mfg. Co., Akron, O.
●Clarage Fan Co., Kalamazoo, Mich.
Knowles Mushroom Ventilator Co., New York City
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Tuttle & Bailey, Inc., New Britain, Conn.

VENTILATORS, ROOF, FAN

●Aeolus Dickinson, Chicago, Ill.
●Air Controls, Inc., Cleveland, O.
Airmaster Corp., Chicago, Ill.
Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
Bishop & Babcock Sales Co., Cleveland, O.
Burt Mfg. Co., Akron, O.
Century Fan & Engineering Co., New York City
Champion Blower & Forge Co., Lancaster, Pa.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Fingles, Inc., W. A., Baltimore, Md.
●General Regulator Corp., Chicago, Ill.
Goethel Co., Alfred C., Milwaukee, Wis.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Howes Co., S. M., Charlestown, Boston, Mass.
Ilg Electric Ventilating Co., Chicago, Ill.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Johnson Fan & Blower Corp., Chicago, Ill.
●Jordan & Co., Paul R., Indianapolis, Ind.
●Lau Heating Service, Inc., Dayton, O.
Myers Electric Co., Pittsburgh, Pa.
New York Blower Co., Chicago, Ill.
Royal Ventilator Co., Philadelphia, Pa.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Viking Air Conditioning Corp., Cleveland, O.
Western Rotary Ventilator Co., Inc., Los Angeles, Cal.

VENTILATORS, ROOF, GRAVITY

Accurate Mfg. Works, Chicago, Ill.
●Aeolus Dickinson, Chicago, Ill.
Airtherm Mfg. Co., St. Louis, Mo.
Allen Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
American-Larson Ventilating Co., Pittsburgh, Pa.
American Sheet Metal Works, New Orleans, La.
Anderson Mfg. Co., Des Moines, Ia.
Arex Co., Chicago, Ill.
●Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Co., Akron, O.
●Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Clay Equipment Corp., Cedar Falls, Ia.
Danzer Metal Works, Inc., Hagerstown, Md.
Day Co., The, Minneapolis, Minn.
Decatur Iron & Steel Co., Decatur, Ala.
Drummond Sheet Metal Works, Wichita, Kan.
Edwards Mfg. Co., Inc., Cincinnati, O.
Fingles, Inc., W. A., Baltimore, Md.
General Sheet Metal Works, Inc., Bridgeport, Conn.
Globe Ventilator Co., Troy, N. Y.
Goethel Co., Alfred C., Milwaukee, Wis.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Howes Co, S. M., Charlestown, Boston, Mass.
Hudson Equipment Corp., Minneapolis, Minn.
International Steel Co., Evansville, Ind.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Johns-Manville, New York City
●Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.
Kleenaire Corp., Stevens Point, Wis.
LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.
●Lamneck Products, Inc., Columbus, O.
Lee & Son Co., Thomas, Cincinnati, O.
Levow, David, New York City
Martin Metal Mfg. Co., Wichita, Kan.
Mellish & Murray Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
●Meyer & Bro. Co., F., Peoria, Ill.
Midwest Ventilating Works, Milwaukee, Wis.
●Milcor Steel Co., Milwaukee, Wis.
Novy Ventilator Mfg. Co., Muskogee, Okla.
Park City Cornice Works, Inc., Bridgeport, Conn.
Perkins & Brown, Chicago, Ill.
●Providence Cornice Co., Providence, R. I.
Racine Sheet Metal Works, Racine, Wis.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Standard Ventilator Co., Lewisburg, Pa.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
●Swartwout Co., Cleveland, O.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Uno Ventilator Co., Cliftondale, Mass.
Van Noorden Co., E., Boston, Mass.
Watson Co., Inc., Jas. H., Bradley, Ill.
Western Rotary Ventilator Co., Inc., Los Angeles, Cal.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

WARM AIR REGISTER SHIELDS

See Shields, Warm Air Register

WASHERS, AIR, FURNACE

●Air Conditioning Equipment Corp., Minneapolis, Minn.
Aladdin Heating Corp., Oakland, Cal.
American Furnace Co., St. Louis, Mo.
Ames Co., W. R., San Francisco, Cal.
Bishop & Babcock Sales Co., Cleveland, O.
Brown Sheet Iron & Steel Co., St. Paul, Minn.
Campbell Heating Co., Des Moines, Ia.
Columbus Heating & Ventilating Co., Columbus, O.
Economy Baler Co., Ann Arbor, Mich.
Emerson Electric Mfg. Co., St. Louis, Mo.
●Furblo Co., Hermansville, Mich.
Gehri Co., Tacoma, Wash.
Green Foundry & Furnace Works, Des Moines, Ia.
Hoersting & Holtmann Co., Dayton, O.

Kelsey Heating Co., Syracuse, N. Y.
●Lau Heating Service, Inc., Dayton, O.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
McPherson Furnace & Supply Co., Portland, Ore.
●Meyer Furnace Co., Peoria, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Fan & Blower Corp., Chicago, Ill.
Nelson Co., Detroit, Mich.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Peerless Electric Co., Warren, O.
Premier Furnace Co., Dowagiac, Mich.
●Richardson & Boynton Co., New York City
●Round Oak Co., Dowagiac, Mich.
Spencer Air Conditioning Service, Denver, Colo.
Spray-Wheel Air Conditioners, Inc., Denver, Colo.
Texo Sales & Mfg. Co., Cincinnati, O.
U. S. Air Conditioning Corp., Minneapolis, Minn.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.

WASHERS, AIR, HEATING AND VENTILATING

(Capacity 4,000 c. f. m. and up)

American Blower Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
Ames Co., W. R., San Francisco, Cal.
Bayley Blower Co., Milwaukee, Wis.
Betz Unit Air Cooler Co., Kansas City, Mo.
Bishop & Babcock Sales Co., Cleveland, O.
●Buffalo Forge Co., Buffalo, N. Y.
●Campbell Heating Co., E. K., Kansas City, Mo.
Carrier Engineering Corp., Newark, N. J.
●Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Ventilating Co., Columbus, O.
Electrovent Fan & Mfg. Co., Chicago, Ill.
●Furblo Co., Hermansville, Mich.
King Ventilating Co., Owatonna, Minn.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Mellish & Murray Co., Chicago, Ill.
National Fan & Blower Corp., Chicago, Ill.
Nelson Co., Detroit, Mich.
New York Blower Co., Chicago, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Peterson Freezem Mfg. Co., Kansas City, Mo.
Reliance Refrigeration Machine Co., Chicago, Ill.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Texo Sales & Mfg. Co., Cincinnati, O.
Trane Co., La Crosse, Wis.
U. S. Air Conditioning Corp., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.
York Ice Machinery Corp., York, Pa.

WATER CIRCULATING PUMPS

See Pumps, Water Circulating

WATER COILS

See Coils, Cooling, Water

WATER HEATERS

See Coils, Fire Pot, Hot Water

WEATHER STRIPS, METAL

Accurate Metal Weather Strip Co., New York City
Allmetal Weatherstrip Co., Chicago, Ill.
American Metal Weather Strip Co., Grand Rapids, Mich.
Chamberlin Metal Weather Strip Co., Detroit, Mich.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Diamond Metal Weather Strip Co., Columbus, O.
Ideal Metal Weather Strip Co., Boulder, Colo.
Johnson Metal Products Co., Erie, Pa.
Metal Products Co., Cincinnati, O.
Monarch Metal Weatherstrip Corp., St. Louis, Mo.
Newman Brothers, Inc., Cincinnati, O.
Northern Weatherstrip Co., Duluth, Minn.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Yardley Screen & Weather Strip Corp., Columbus, O.

WELDERS, ARC

Air Reduction Sales Co., New York City
Alter-Arc Mfg. Co., Lawton, Okla.
Electric Arc Cutting & Welding Co., Newark, N. J.
General Equipment Co., Wichita, Kan.
●General Electric Co., Schenectady, N. Y.
Hammett Mfg. Co., Kansas City, Mo. (A.C.)
Harnischfeger Corp., Milwaukee, Wis.
Hobart Brothers Co., Troy, O.
Ideal Electric & Mfg. Co., Mansfield, O.
Lee & Son Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Maple Valley Mfg. Co., Mapleton, Ia.
Master Welders, Kansas City, Mo. (A.C.)
Miller Electric Mfg. Co., Appleton, Wis.
Myers Electric Co., Pittsburgh, Pa.
Star Electric Motor Co., Bloomfield, N. J.
Tatro Brothers, Inc., Decorah, Ia.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Welding Service Sales, Inc., San Francisco, Cal. (AC or DC)
Will-Weld Mfg. Co., Inc., Omaha, Nebr.
Wilson Welder & Metals Co., Inc., North Bergen, N. J.

WELDERS, SPOT

Acme Electric Welder Co., Huntington Park, Cal.
Electric Arc Cutting & Welding Co., Newark, N. J.
●General Electric Co., Schenectady, N. Y.
Glascock Bros. Mfg. Co., Muncie, Ind.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Steen-Dyer Mfg. Co., Kansas City, Mo.
Taylor-Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O. (Butt and Seam)
Thomson-Gibb Electric Welding Co., Lynn, Mass.

WELDING EQUIPMENT, OXY-ACETYLENE

Air Reduction Sales Co., New York City
Bastian-Blessing Co., Chicago, Ill.
Burdett Mfg. Co., Chicago, Ill.
Carbo-Oxygen Co., Pittsburgh, Pa.
Gasweld & Airway, Inc., Chicago, Ill.
Harris Calorific Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Linde Air Products Co., New York City
Milburn Co., Alexander, Baltimore, Md.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torchweld Equipment Co., Chicago, Ill.

WELDING ROD

See Rod, Welding

WELDING TORCHES

See Torches, Brazing, Cutting, Welding

WHEELS, BLOWER

●Advance Aluminum Castings Corp., Chicago, Ill.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
●Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
●Clarage Fan Co., Kalamazoo, Mich.
Economy Electric Mfg. Co., Cicero, Ill.
Janette Mfg. Co., Chicago, Ill.
●Lau Heating Service, Inc., Dayton, O.
National Fan & Blower Corp., Chicago, Ill.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Torrington Mfg. Co., Torrington, Conn.
U. S. Air Conditioning Corp., Minneapolis, Minn.

WINDOWS, HOLLOW METAL

American Sheet Metal Works, New Orleans, La.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Falstrom Co., Passaic, N. J.
Herrmann & Grace Co., Brooklyn, N. Y.
Newman Brothers, Inc., Cincinnati, O.
Perkinson & Brown, Chicago, Ill.
●Providence Cornice Co., Providence, R. I.
Truscon Steel Co., Youngstown, O.
Willis Mfg. Co., Galesburg, Ill.

WIRE, PLAIN, GALVANIZED AND COPPERED

Aluminum Co. of America, Pittsburgh, Pa. (Aluminum)
●American Brass Co., Waterbury, Conn. (Copper and copper alloys)
American Nickeloid Co., Peru, Ill. (Chrome, nickel coated)
American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa. (Plain, galvanized)
California Wire Cloth Co., Oakland, Cal. (Cloth)
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Steel & Wire Co., Chicago, Ill.
Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind. (Plain, galvanized steel)
Copperweld Steel Co., Glassport, Pa. (Copper covered steel)
Gulf States Steel Co., Birmingham, Ala.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Ludlow-Saylor Wire Co., St. Louis, Mo. (Cloth)
Page Steel & Wire Co., Monessen, Pa.
●Republic Steel Corp., Cleveland, O. (Steel)
Roebling's Sons Co., John A., Trenton, N. J.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Townsend Co., New Brighton, Pa. (Plain and coppered)
Western Wire & Iron Works, Inc., Chicago, Ill.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
●Wickwire Spencer Steel Co., New York City
Youngstown Sheet & Tube Co., Youngstown, O.

WROUGHT IRON PLATES

See Plates, Wrought Iron

WROUGHT IRON SHEETS

See Sheets, Wrought Iron

American Artisan

1936 DIRECTORY NUMBER

[Section 2—TRADE NAMES]

A

ABC—Fan Bearings, Ventilators. American Blower Corp., Detroit, Mich.

ABC—Oil Burners. Automatic Burner Corp., Chicago, Ill.

AC—Fan Bearings, Furnace Blowers. Air Controls, Inc., Cleveland, O.

A.E.F.—Electric Welders. American Electric Fusion Corp., Chicago, Ill.

A.G.P.—Gas Burners. American Gas Products Corp., New York, N. Y.

A-P—Humidistats, Motors, Regulators, Thermostats, Valves. Automatic Products Co., Milwaukee, Wis.

Acco-Lastic—Caulking Compounds. Accurate Metal Weather Strip Co., New York, N. Y.

Accurate—Chimney Caps and Tops, Ventilators. Accurate Mfg. Works, Chicago, Ill.

Acidseal—Paint. B. F. Goodrich Co., Akron, O.

Action Air—Blowers. Brown Corp., Syracuse, N. Y.

Adams—Dampers. Jas. H. Watson Co., Inc., Bradley, Ill.

Aeolus—Gravity Roof Ventilators. Aeolus Dickinson, Chicago, Ill.

Aeracool—Fan Blades, Fans, Louvres, Ventilators. Myers Electric Co., Pittsburgh, Pa.

Aerocrat—Air Conditioning Units, Blowers and Blower Units, Fans, Furnaces, Humidifiers, Washers. W. R. Ames Co., San Francisco, Cal.

Aeropel—Kitchen Exhaust Fans. American Blower Corp., Detroit, Mich.

Aeroplane—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.

Aeroplex—Blowers. Bayley Blower Co., Milwaukee, Wis.

Aeropull—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.

Aerovalve—Ventilators. Knowles Mushroom Ventilator Co., New York, N. Y.

Affco—Dampers, Grilles, Louvres, Quadrants, Registers. American Foundry & Furnace Co., Bloomington, Ill.

Agathon—Plates and Sheets. Republic Steel Corp., Cleveland, O.

Airate—Fans, Ventilators. Air Controls, Inc., Cleveland, O.

Airco—Welding Electrodes and Rods. Air Reduction Sales Co., New York, N. Y.

Airco-DB—Oxy-Acetylene Welding Equipment. Air Reduction Sales Co., New York, N. Y.

Aire-Flo—Air Conditioning Units, Blower Units. Lennox Furnace Co., Marshalltown, Iowa.

Airflo—Furnaces. Aladdin Heating Corp., Oakland, Cal.

Airfoil—Fans and Fan Blades. Aerovent Fan Co., Piqua, O.

Airguide — Barometers, Hygrometers, Thermometers. Fee & Stemwedel, Inc., Chicago, Ill.

Airklenzer — Furnace Air Conditioning Unit. Round Oak Co., Dowagiac, Mich.

Airline—Furnaces. Joliet Heating Corp., Joliet, Ill.

Airmaster—Air Conditioning Units. Thatcher Co., Newark, N. J.

Airmat—Filters. American Air Filter Co., Inc., Louisville, Ky.

Airmeter—Hygrometers. Johnson Tool Co., Inc., East Providence, R. I.

Air-O-Matic—Air Conditioning System, Boiler Type, Year Around. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

Air-O-Mist—Humidifiers. Sallada Mfg. Co., Minneapolis, Minn.

Air-Pak—Blower Units. Air Controls, Inc., Cleveland, O.

Airplex—Filters. Davies Air Filter Corp., New York, N. Y.

Airpyrator—Blowers. Burnwell Corp., Allentown, Pa.

Airseal—Insulation. Rock Wool Products Co., Inc., Wabash, Ind.

Airtrol—Air Conditioning Units, Summer and Year Around, Coolers. J. H. McCormick & Co., Williamsport, Pa.

Air-u-well—Fans. Holland Furnace Co., Holland, Mich.

Ajax—Pipe, Roofing. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

Akron Air Blast—Furnaces. May-Fiebeger Co., Newark, O.

Alabama—Ventilators. Decatur Iron & Steel Co., Decatur, Ala.

Alco—Roof Ventilators. Allen Corp., Detroit, Mich.

Alcoa—Roofing, Sheets, Etc. Aluminum Company of America, Pittsburgh, Pa.

All American—Cabinet Heaters. Hayes Custer Stove Co., Bloomington, Ill.

Alma—Heaters. Excelsior Stove & Mfg. Co., Quincy, Ill.

Almetal—Fire Doors. Merchant & Evans Co., Philadelphia, Pa.

Alumbrite—Paint. Thompson & Co., Pittsburgh, Pa.

Always Reliable—Soldering Furnaces, Torches. Otto Bernz Co., Inc., Rochester, N. Y.

Ambassador—Furnaces. P. H. MaGirl Foundry & Furnace Works, Bloomington, Ill.

Ambrac—Sheets. American Brass Co., Waterbury, Conn.

Amco—Nozzles. Grinnell Co., Inc., Providence, R. I.

Amco—Solder. American Solder & Flux Co., Philadelphia, Pa.

American—Controls, Draft Gages, Thermometers. Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.

American—Furnaces. Ryniker Sheet Metal Works, Inc., Billings, Mont.

American—Furnaces, Heaters. American Foundry & Furnace Co., Bloomington, Ill.

American—Smoke Pipe Dampers. Griswold Mfg. Co., Erie, Pa.

Am-Fe-Co—Air Conditioning Units, Blowers and Blower Units. American Machine Products Co., Marshalltown, Iowa.

Anaconda—Flashings, Humidifier Fittings, Plates, Rivets, Roofing, Sheets, Solder, Structurals, Welding Rod, Wire. American Brass Co., Waterbury, Conn.

Anchor—Rivets. Townsend Co., New Brighton, Pa.

Anchor Brand—Nails, Rivets. Townsend Co., New Brighton, Pa.

Anchor-Dayton—Stokers. Anchor Stove & Range Co., New Albany, Ind.

Anchor-Kolstoker — Domestic Stokers. Anchor Stove & Range Co., New Albany, Ind.

Anderson—Spray Nozzles. B. F. Sturtevant Co., Hyde Park, Mass.

Andrake—Arc Welders. Myers Electric Co., Pittsburgh, Pa.

Annis—Air Filters. Coppus Engineering Corp., Worcester, Mass.

Anti-Pluvius—Skylights. G. Drouve Co., Fairfield, Conn.

A-One—Nails. Milcor Steel Co., Milwaukee, Wis.

Apex—Dampers, Quadrants. Ohio Products Co., Cleveland, Ohio.

Apollo—Roofing. American Sheet and Tin Plate Co., Pittsburgh, Pa.

Aqua Bar—Furnace Cement. Continental Products Co., Euclid, O.

Aquazone—Air Conditioning Units, Room Type, Winter. Corozone Air Conditioning Corp., Cleveland, O.

Arco—Air Conditioning Units, Boiler Type, Cleaners. American Radiator Co., New York, N. Y.

Arco-Vecto—Heaters. American Radiator Co., New York, N. Y.

Ardent—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

Arex-Austor—Ventilators. Arex Co., Chicago, Ill.

Arin—Louvres. Arex Co., Chicago, Ill.

Aristo—Pipe Covering. Ruberoid Co., New York, N. Y.

Aristocrat—Registers. Auer Register Co., Cleveland, O.

Armco—Eaves Trough and Gutters, Flashings, Iron and Steel Roofing, Plates, Sheets. American Rolling Mill Co., Middletown, O.

Armorize—Paint. Carter Paint Co., Liberty, Ind.

Arrow—Ventilators. Uno Ventilator Co., Cliftondale, Mass.

Art—Shingles. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

Art—Wood Faces and Grilles. Wooster Art Wood, Inc., Wooster, O.

Asco—Relays, Switches, Valves. Automatic Switch Co., New York, N. Y.

Ath-A-Nor — Furnaces. May - Fiebeger Co., Newark, O.

Atomist—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.

Automatic Drip—Humidifiers. Automatic Humidifier Co., Cedar Falls, Iowa.

Automatic June—Humidifiers. Monmouth Products Co., Cleveland, O.

Automatik—Furnaces. Premier Furnace Co., Dowagiac, Mich.

Autovent—Air Conditioning Units, Blowers, Fans, Autovent Fan & Blower Co., Chicago, Ill.

B

BB—Fittings and Accessories. Berger Bros. Co., Philadelphia, Pa.

BNCO—Sheet Metal Products. Biersach & Niedermeyer Co., Milwaukee, Wis.

B-W—Relays, Switches. Bender Warrick Corp., Birmingham, Mich.

Badger — Machines, Metal Workers' Tools, Pumps. Rock River Machine Co., Inc., Janesville, Wis.

Ball Bearing—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.

Balmi-Aire—Air Conditioning Units, Blower Units, Washers. U. S. Air Conditioning Corp., Minneapolis, Minn.
Barber—Gas Burners. Barber Gas Burner Co., Cleveland, O.
Barcol—Motors. Barber Colman Co., Rockford, Ill.
Bard—Air Conditioning Units, Blower Units, Furnaces. Bryan Plumbing & Heating Co., Bryan, O.
Barry—Pulleys. R. & J. Dick Co., Inc., Passaic, N. J.
Bead—Furnace Chain. Bead Chain Mfg. Co., Bridgeport, Conn.
Beaver—Insulation. Certain-teed Products Corp., New York, N. Y.
Bell—Eaves Trough Hangers. Abbott Mfg. Co., Painesville, O.
Beloit—Machines, Punches, Tools. Hendley & Whittemore Co., Beloit, Wis.
Benco—Oil Burners. W. M. Bennett Corp., Omaha, Nebr.
Benefactor—Furnaces. Hess Warming & Ventilating Co., Chicago, Ill.
Bengal—Furnaces, Heaters. Floyd-Wells Co., Royersford, Pa.
Bennett-Allison—Oil Burners. W. M. Bennett Corp., Omaha, Nebr.
Berger—Expanded Metal Lath. Truscon Steel Co., Youngstown, O.
Berloy—Berger Mfg. Co., Div. Republic Steel Corp., Canton, O.
Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.
Bethlehem Doe—Oil Burners. Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Bettendorf—Oil Burners. Micro Corp., Bettendorf, Iowa.
Big Sioux—Furnaces. Iowa Foundry Co., Sioux City, Iowa.
Black Diamond—Built-up Roofing. Barrett Co., New York, N. Y.
Black Diamond—Furnaces, Heaters. Maple City Furnace Co., Monmouth, Ill.
Blo-Matic—Stokers. Her-Born Engineering & Mfg. Co., Sandusky, O.
Blue Streak—Blowers, Heaters, Humidifiers, Washers. Western Blower Co., Seattle, Wash.
Boiler Plate—Furnaces. Williamson Heater Co., Cincinnati, O.
Bon-Air—Air Conditioning Units, Blower Units, Furnaces. Rudy Furnace Co., Dowagiac, Mich.
Boomer—Furnaces, Heaters. Hess-Snyder Co., Massillon, O.
Braden-Everedy—Furnaces, Oil Burners. Oil Burner Builders, Inc., Rock Island, Ill.
Branford—Oil Burners. Malleable Iron Fittings Co., Branford, Conn.
Brauer's—Dampers. A. G. Brauer Supply Co., St. Louis, Mo.
Breco—Air Conditioning Units, Kitchen Exhaust Fans. Barrett Regulation Engineers Co., Cleveland Heights, O.
Brightholm—Furnace and Smoke Pipe Fittings and Accessories, Insulation. Airven Co., New York, N. Y.
Bri-Tex—Insulation. Creo-Dipt Co., Inc., North Tonawanda, N. Y.
Brookcell—Metal Ceilings. Brooklyn Metal Ceiling Co., Brooklyn, N. Y.
Browne—Furnaces, Oil Burners. Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.
Browning—Belts, Pulleys. Ohio Valley Pulley Works, Maysville, Ky.
Brunett—Furnaces, Heat Savers. Brown Sheet Iron & Steel Co., St. Paul, Minn.
Buffalo—Blowers, Fans, Ventilators. Buffalo Forge Co., Buffalo, N. Y.
Bung-Lo—Floor and Warm Air Furnaces. Geo. J. Cocking, Santa Ana, Cal.
Burmester—Furnaces, Oil Burners. Hotentot Co., Inc., Omaha, Nebr.
Butler—Furnaces. Ramey Mfg. Co., Columbus, O.

C

C-E—Stokers. Combustion Engineering Co., Inc., New York, N. Y.
Caloric—Furnaces. Marshall Furnace Co., Marshall, Mich.
Calorider—Humidifiers. Research Corp., New York, N. Y.
Calwico—Wire Cloth. California Wire Cloth Co., Oakland, Cal.
Camel—Valves. C. L. Bryant Corp., Cleveland, O.
Capital—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.
Capitol—Air Conditioning Units, Furnaces. United States Radiator Corp., Detroit, Mich.
Capitol—Insulation. Standard Lime & Stone Co., Baltimore, Md.
Capitol—Weather Strips. Diamond Metal Weather Strip Co., Columbus, Ohio.
Carbo—Torches. Carbo-Oxygen Co., Pittsburgh, Pa.
Carola—Heaters. Cary Mfg. Co., Waupaca, Wis.
Carton—Furnaces. International Heater Co., Utica, N. Y.
Case-Schaffer—Furnaces. Western Furnaces, Inc., Tacoma, Wash.
Castalu—Fans. Advance Aluminum Castings Corp., Chicago, Ill.
Caulk-O-Seal—Caulking and Glazing Compounds. Calbar Paint & Varnish Co., Philadelphia, Pa.
Cel-Lux—Insulation. Norristown Magnesia & Asbestos Co., Norristown, Pa.
Cementico—Concrete Paint. United States Gypsum Co., Chicago, Ill.
Cementite—Paint. Thompson & Co., Pittsburgh, Pa.
Cementkote—Paint. Tropical Paint & Oil Co., Cleveland, O.
Challenge—Furnaces. Standard Foundry & Furnace Co., DeKalb, Ill.
Chamberlin—Automatic Humidifier. Chandler Co., Cedar Rapids, Ia.
Champion—Metal Workers' Tools. Champion Tool Co., Los Angeles, Cal.
Charavay—Blowers, Fans. Hartzell Propeller Fan Co., Piqua, O.
Chicago—Brakes and Presses. Dreis & Krump Mfg. Co., Chicago, Ill.
Chief—Cabinet Heaters. Independent Stove & Furnace Co., Independence, Mo.
Chief—Furnaces. Joliet Heating Corp., Joliet, Ill.
Chilly-Air—Ice Cooler. Kauffman Air Conditioning Corp., St. Louis, Mo.
Chinook—Heating Coils. Bayley Blower Co., Milwaukee, Wis.
Chinookfin—Heating Coils. Bayley Blower Co., Milwaukee, Wis.
Christie—Furnace Vacuum Cleaners. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Chronat—Furnace and Boiler Repairs. National Fdry. & Furnace Co., Dayton, O.
Chronotherm—Thermostat. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Cibulas—Skylights, Ventilators. General Sheet Metal Works, Inc., Bridgeport, Conn.
Clamp On—Humidifier Fittings. Sallada Mfg. Co., Minneapolis, Minn.
Classic—Registers. Auer Register Co., Cleveland, O.
Clauss—Snips and Shears. Clauss Shear Co., Fremont, O.
Cleanaire—Blower-Filters. Peerless Foundry Co., Indianapolis, Ind.
Cleveland—Stokers. Reliance Electric & Engineering Co., Cleveland, O.
Clifton—Oil Burner. Electrol, Inc., Clifton, N. J.
Climate-Changer—Air Conditioning Furnaces, Air Conditioning Units. Trane Co., LaCrosse, Wis.
Climate Maker—Air Conditioning Units, Furnaces. American Foundry & Furnace Co., Bloomington, Ill.
Climator—Air Conditioning Units, Winter, Blower Units, Washers. L. J. Mueller Furnace Co., Milwaukee, Wis.
Coal Master—Stoker-fired Furnace. Round Oak Co., Dowagiac, Mich.
Colonial—Blower-Filter-Washer Combinations, Fans, Furnaces, Heaters. Green Foundry & Furnace Works, Des Moines, Iowa.
Colonial—Registers. Auer Register Co., Cleveland, O.
Colortipt—Arc Welding Electrodes. Wilson Welder & Metals Co., Inc., North Bergen, N. J.
Columbia—Damper Clips and Tips. S. M. Howes Co., Charlestown, Mass.
Columbus—Furnaces. Surface Combustion Corp., Toledo, O.
Columbus—Stokers. National Steam Pump Co., Upper Sandusky, O.
Columbus—Ventilators. F. O. Schoedinger Co., Columbus, O.
Combustion—Oil Burners. Heil Co., Milwaukee, Wis.
Comet—Fans, Ventilators. New York Blower Co., Chicago, Ill.
Comfort—Furnaces. J. B. Foote Foundry Co., Fredericktown, O.
Comfort—Furnaces. Standard Furnace & Supply Co., Omaha, Nebr.
Comfortaire—Air Conditioning Units. Joliet Heating Corp., Joliet, Ill.
Comfortaire—Stokers. Hamilton Automatic Stoker Corp., Hamilton, O.
Comfortmaker—Air Conditioning Units, Furnaces. Joliet Heating Corp., Joliet, Ill.
Comfortrol—Air Conditioning Units, Blowers and Blower Units, Washers. Waterman-Waterbury Co., Minneapolis, Minn.
Compact—Air Conditioning Units, Blowers. Bishop & Babcock Sales Co., Cleveland, O.
Compass—Belts. Goodyear Tire & Rubber Co., Akron, O.
Condor—Belts. Raybestos-Manhattan, Inc., Passaic, N. J.
Controlaire—Furnaces. "Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Control-O-Gas—Valves. Payne Furnace & Supply Co., Beverly Hills, Cal.
Convector—Furnace. L. J. Mueller Furnace Co., Milwaukee, Wis.
Coolair—Blowers, Fans. American Coolair Corp., Jacksonville, Fla.
Copperior—Sheets: Superior Sheet Steel Co., Canton, O.
Cop-R-Loy—Sheet Metal Products. Wheeling Corrugating Co., Wheeling, W. Va.
Cop-R-Loy—Sheets. Wheeling Steel Corp., Wheeling, W. Va.
Corinco—Insulation. Cork Insulation Co., Inc., New York, N. Y.
Coxe—Stokers. Combustion Engineering Co., Inc., New York, N. Y.
Crawford—Furnaces. Walker & Pratt Mfg. Co., Boston, Mass.
Crescent—Oil Burners. Caloroil Burner Corp., Hartford, Conn.
Crescent—Ornaments, Skylights, Ventilators. American Sheet Metal Works, New Orleans, La.
Crescent—Ventilators. F. Meyer & Bro. Co., Peoria, Ill.
Crimpedge—Eaves Trough, Gutters. Milcor Steel Co., Milwaukee, Wis.

D

D-Q—Furnace Vacuum Cleaners. Densmore-Quinlan Co., Kenosha, Wis.
Dadco—Automatic Damper. Dutcher Heating Co., Canton, Mass.
Dailaire—Air Conditioning Units, Blowers and Blower Units, Furnaces. Dail Steel Products Co., Lansing, Mich.
Dayton—Air Conditioning Units, International Engineering, Inc., Dayton, O.
Deflecto—Ventilators, The Day Co., Minneapolis, Minn.
Delco Heat—Oil Burners, Conditioners, Blowers, Furnaces, Fans. Delco Appliance Corp., Rochester, N. Y.
Delphos—Sheet Metal Products. New Delphos Mfg. Co., Delphos, O.
DeLuxe—Air Conditioning Furnaces. Williamson Heater Co., Cincinnati, O.
DeLuxe—Heaters. Agricola Furnace Co. Inc., Gadsen, Ala.
DeLuxe—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.
Denafelt—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Dens-Pac—Asbestos Cement. Norristown Magnesia & Asbestos Co., Norristown, Pa.
Dependable—Paint. Heath & Milligan Mfg. Co., Chicago, Ill.
Detroit—Controls, Valves. Detroit Lubricator Co., Detroit, Mich.
Diamond—Compounds. Thompson & Co., Pittsburgh, Pa.

Diamond—Roofers' Mop Heads. Mill Products Co., Elberton, Ga.
Diamond—Smoke Pipe Dampers. Adams Co., Dubuque, Iowa.
Diamond H—Relays, Switches, Thermostats. Hart Mfg. Co., Hartford, Conn.
Dickbelt—Flat Belts. R. & J. Dick Co., Passaic, N. J.
Dickinson—Dampers, Scuppers, Ventilators. Aeolus Dickinson, Chicago, Ill.
Dickrope—V-type Belts. R. & J. Dick Co., Passaic, N. J.
Di-En-Key—Expansion Bolts. Diamond Expansion Bolt Co., Garwood, N. J.
Doe—Oil Burners, Bethlehem Foundry & Machine Co., Bethlehem, Pa.
DoubleDuty—Filters. Independent Air Filter Co., Chicago, Ill.
Dover-Imperial—Eaves Trough Hangers. Ohio Wire Products Co., Dover, O.
Dow—Pipe. Sterling Foundry Co., Sterling, Ill.
Dowagiac—Furnaces. Rudy Furnace Co., Dowagiac, Mich.
Draftmaster—Regulators. Piatt Products Corp., Lansing, Mich.
Dreadnaught—Furnaces, Torches. P. Wall Mfg. Supply Co., Pittsburgh, Pa.
Dricool—Cooling Surface. Betz Unit Air Cooler Co., Kansas City, Mo.
Dri-Cool—Room Coolers. U. S. Air Conditioning Corp., Minneapolis, Minn.
Dridrum—Filters. American Air Filter Co., Inc., Louisville, Ky.
Drifilter—Filters. American Air Filter Co. Inc., Louisville, Ky.
Dri-N-Tite—Cement. A. C. Horn Co., Long Island City, N. Y.
Drou-Ve-Lite—Skylights. G. Drouve Co., Fairfield, Conn.
Dual-Air—Ventilators. General Regulator Corp., Chicago, Ill.
Ducturns—Turning Blades. Tuttle & Bailey, Inc., New Britain, Conn.
Dulator—Air Conditioning Units. Bryant Heater Co., Cleveland, O.
Dul-Kote—Sheets. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Dunco—Relays, Switches. Struthers Dunn, Inc., Philadelphia, Pa.
Duoblo—Air Conditioning Furnaces. American Furnace Co., St. Louis, Mo.
Duo-Ba—Cabinet Heaters. Independence Stove & Furnace Co., Independence, Mo.
Duotherm—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.
Duo-Therm—Cabinet Heaters. Motor Wheel Corp., Lansing, Mich.
Duo-Weld—Furnaces. Premier Furnace Co., Dowagiac, Mich.
Duplex—Furnace Vacuum Cleaners. Ramey Mfg. Co., Columbus, O.
Dur-A-Ble—Furnaces. "Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Durco—Rivets. Duriron Co. Inc., Dayton, O.
Durimet—Sheets. Duriron Co. Inc., Dayton, O.
Duronze—Sheets. Bridgeport Brass Co., Bridgeport, Conn.
Dustop—Filters. Owens-Illinois Glass Co., Newark, O.
Dux-Bac—Shingles. Milcor Steel Co., Milwaukee, Wis.
Dwedox—Welding Rod. Central Steel & Wire Co., Chicago, Ill.

E

E-Z Fit—Roof Edging. Berger Bros. Co., Philadelphia, Pa.
E-Z-Hung—Eaves Trough. Jas. H. Watson Co., Inc., Bradley, Ill.
Eaglesfield—Wood Faces. Eaglesfield Ventilator Co., Indianapolis, Ind.
Earle—Ventilators. Berger Bros. Co., Philadelphia, Pa.
Easy-Flo—Welding Rod. Handy & Harmon, New York, N. Y.
Easy-Slip—Conductor Pipe, Eaves Trough. La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Economy—Air Conditioning Units, Furnaces, Heaters. International Heater Co., Utica, N. Y.
Economy—Blow Pipe Hoods. Kirk & Blum Mfg. Co., Cincinnati, O.
Economy—Registers. Auer Register Co., Cleveland, O.
Economy—Stokers. Christensen Machine Co., Salt Lake City, Utah.
Edmanco—Ceilings, Shingles, Sheet Metal Products. Edwards Mfg. Co., Inc., Cincinnati, O.
Effco—Skylights, Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.
Ekco—Fans, Furnaces, Washers. E. K. Campbell Heating Co., Kansas City, Mo.
Elastigum—Cement. Barrett Co., New York, N. Y.
Elastikote—Paint. Tropical Paint & Oil Co., Cleveland, O.
Electric Janitor—Regulator. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Electro Way—Fans. Ward Mfg. Co., Detroit, Mich.
Electrozone—Ozonizers. Triox Eng. Co., St. Louis, Mo.
Elite—Registers. Auer Register Co., Cleveland, O.
Eller—Sheet Metal Products. Milcor Steel Co., Milwaukee, Wis.
Ellison—Draft Gages. Ellison Draft Gage Co., Chicago, Ill.
Emco—Garages. Edwards Mfg. Co., Cincinnati, O.
Emco—Valves. Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
Emerald Cord—Belts. Goodyear Tire & Rubber Co., Akron, O.
Enduro—Sheets. Republic Steel Corp., Cleveland, O.
Epco—Perforated Metals. Erdle Perforating Co., Rochester, N. Y.
Equator—Furnaces, Heaters. Lennox Furnace Co., Marshalltown, Iowa.
Erocel—Pipe Covering. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Esico—Electric Soldering Coppers. Electric Soldering Iron Co., New York, N. Y.
Eternit—Cement, Insulation, Roofing, Shingles. Ruberoid Co., New York, N. Y.
Eureka—Furnaces. Home Stove Co., Indianapolis, Ind.
Evansway—Furnaces. George Evans Corp., Moline, Ill.
Evco—Valves. Electric Valve Mfg. Co., New York, N. Y.
Everdur—Structural Shapes, Welding Rod. American Brass Co., Waterbury, Conn.
Everedy—Oil Burners. Oil Burner Builders, Inc., Rock Island, Ill.
Everjet—Paint. Barrett Co., New York, N. Y.
Everlast—Air Conditioning Units, Furnaces. Pacific Gas Radiator Co., Huntington Park, Cal.
Everlast—Furnaces. Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.

F

FAU—Forced Air Furnace Unit. Payne Furnace & Supply Co., Beverly Hills, Cal.
FXE—Underfeed Stokers. Flynn & Emrich Co., Baltimore, Md.
Fabrikated—Grilles, Registers. Independent Register & Mfg. Co., Cleveland, O.
Fairweather—Air Conditioning Units, Blowers and Blower Units, Washers. Furblo Co., Hermansville, Mich.
Falco—Sheets. Fairmont Aluminum Co., Fairmont, W. Va.
Fano-Flame—Oil Burners. Morey & Jones, Ltd., Los Angeles, Cal.
FarqUaire—Air Conditioning Units, Blower Units. Farquhar Furnace Co., Wilmington, O.
FarQuar—Furnaces. Farquhar Furnace Co., Wilmington, O.
Faultless—Furnaces. Faultless Heater Corp., Cleveland, O.
Faultless—Furnaces, Heaters. Standard Furnace & Supply Co., Omaha, Nebr.
Favorite—Furnace and Smoke Pipe Fittings and Accessories. Williamson Heater Co., Cincinnati, O.
Featherfin—Coils. L. J. Wing Mfg. Co., New York, N. Y.
Ferrocraft—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.
Ferro-Therm—Insulation, Sheets. American Flange & Mfg. Co., Inc., New York, N. Y.
Fibre-Pak—Filters. Independent Air Filter Co., Chicago, Ill.
Fibrofelt—Insulation. Union Fibre Co., Inc., Winona, Minn.
Filteraire—Air Filters. Wilson & Co., Chicago, Ill.
Filtered Aire—Blowers and Blower Units. American Foundry & Furnace Co., Bloomington, Ill.
Filticooler—Blower-Filter. B. F. Sturtevant Co., Hyde Park, Mass.
Fine Air—Air Conditioning Units. Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.
Firecrete—Refractories. Johns-Manville, New York, N. Y.
Fireite—Cement. Johns-Manville, New York, N. Y.
Fire-King—Stokers. Sinker-Davis Co., Indianapolis, Ind.
Fireline—Plastic Firepot Lining. Plibrico Jointless Firebrick Co., Chicago, Ill.
Fire Tender—Stokers. Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Firma—Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.
Fitchburg—Oil Burners. E. W. Skinner Co., Fitchburg, Mass.
Fitrite—Conductor, Eaves Trough and Gutter Fittings and Accessories, Roofers' Mop Heads, Skylight Lifts, Snow Guards, Ventilators. David Levow, New York, N. Y.
Fixit—Cement. National Mfg. Corp., Tonawanda, N. Y.
Floezy—Solder. Merchant & Evans Co., Philadelphia, Pa.
Fluid Heat—Oil Burners. Anchor Post Fence Co., Baltimore, Md.
Forbes Syphonaire—Ventilators. Western Rotary Ventilator Co., Inc., Los Angeles, Cal.
Forbes Tri-Peller—Fans. Western Rotary Ventilator Co., Inc., Los Angeles, Cal.
Fosco—Cornices, Metal Ceilings, Skylights, Etc. F. O. Schoedinger Co., Columbus, O.
Franklin—Stokers. Columbus Metal Products, Inc., Columbus, O.
Free-Man—Stokers. Illinois Iron & Bolt Co., Chicago, Ill.
Freeport—Stokers. Holtum Mfg. Co., Freeport, Ill.
Freezem—Blowers. Peterson Freezem Mfg. Co., Kansas City, Mo.
Front End—Paint. Barrett Co., New York, N. Y.
Front Rank—Furnaces. Liberty Foundry Co., St. Louis, Mo.
Fulscope—Controls. Taylor Instrument Companies, Rochester, N. Y.
Furnastender—Domestic Stokers. Combustioneer, Inc., Springfield, O.
Furnastoker—Domestic Stokers. Combustioneer, Inc., Springfield, O.

G

G & O—Heat Transfer Sections. G & O Mfg. Co., New Haven, Conn.
G. B. C.—Blowers, Fans. General Blower Co., Philadelphia, Pa.
G. E.—Air Conditioning Units, Controls, Motors. General Electric Co., New York City and Schenectady, N. Y.
Garland—Furnaces, Heaters, Repairs. Detroit-Michigan Stove Co., Detroit, Mich.
Garrick—Regulators. Hays Corp., Michigan City, Ind.
Gar-Wood—Air Conditioning Furnaces and Units. Gar Wood Industries, Inc., Detroit, Mich.
Gas Era—Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.
Gastite—Furnaces. Waterman-Waterbury Co., Minneapolis, Minn.
Gem—Furnaces. Robinson Furnace Co., Chicago, Ill.
Gem—Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.
Gen-Arc—Arc Welders. General Equipment Co., Wichita, Kan.
Genasco—Cement, Shingles. Barber Asphalt Co., Philadelphia, Pa.
Gerhardt—Furnaces. W. R. Ames Co., San Francisco, Cal.
Gibraltar—Furnaces, Heaters. P. H. Ma-Girl Foundry & Furnace Works, Bloomington, Ill.
Gilbarco—Furnaces, Air Conditioning Units. Gilbert & Barker Mfg. Co., Springfield, Mass.

Gilt Edge—Flat Belts. J. E. Rhoads & Sons, Philadelphia, Pa.
Gimco—Insulation. General Insulating & Mfg. Co., Alexandria, Ind.
Globe—Roofing, Shingles and Tile. New port Rolling Mill Co., Newport, Ky.
Globe—Sheets, Roofing. Globe Iron Roofing & Corrugating Co., Cincinnati, O.
Globe Sizzler—Water Heater Coils. Globe Machinery & Supply Co., Des Moines, Iowa.
Gohi—Eaves Trough & Gutters, Roofing, Sheets. Newport Rolling Mill Co., Newport, Ky.
Golden Rod—Air Conditioning Units, Bearings, Blowers, Coils. F. Jaden Mfg. Co., Inc., Hastings, Nebr.
Golden Star—Furnaces, Ridge Rolls and Ridging. J. M. & L. A. Osborn Co., Cleveland, O.
Goss—Humidistats. W. R. Ripley Co., Tacoma, Wash.
Gulfsteel—Electrodes, Nails, Plates, Rod, Roofing, Sheets, Structural Shapes, Wire. Gulf States Steel Co., Birmingham, Ala.
Gulf Stream—Blower Units, Furnaces. Perfect Burner Co., Lynn, Mass.

H

H & C—Chain, Clips and Tips, Faces, Grilles, Pulleys, Quadrants, Registers, Regulators, Ventilators. Hart & Cooley Mfg. Co., Chicago, Ill.
Haals—Louvres. American Sheet Metal Works, New Orleans, La.
HairBestos—Insulation. Wilson & Co., Inc., Chicago, Ill.
Haircraft—Insulation. Wilson & Co., Inc., Chicago, Ill.
HairPad—Filters. Independent Air Filter Co., Chicago, Ill.
Handnib—Punches. National Machine Tool Co., Racine, Wis.
Handy—Furnace and Smoke Pipe, Furnace and Smoke Pipe Fittings and Accessories, Prefabricated Ducts and Fittings, Ventilators. F. Meyer & Bro. Co., Peoria, Ill.
Handy Change—Arc Welders. Maple Valley Mfg. Co., Mapleton, Iowa.
Happy Thought—Heaters. Pittston Stove Co., Pittston, Pa.
Health Air—Blowers, Furnaces, Humidifiers, Washers. Economy Baler Co., Ann Arbor, Mich.
Healthaire—Humidifiers. Rochester Mfg. Co., Inc., Rochester, N. Y.
Healthifier — Humidifiers. Williamson Heater Co., Cincinnati, O.
Heat-Hustler—Fans. American Foundry & Furnace Co., Bloomington, Ill.
Heat King—Oil Burners. Automatic Burner Corp., Chicago, Ill.
Heatmaster—Furnaces, Humidifiers. Surface Combustion Corp., Toledo, O.
Heato—Air Conditioning Units. Joliet Heating Corp., Joliet, Ill.
Heatrola—Heaters. Estate Stove Co., Hamilton, O.
Heatset—Regulators. Automatic Humidifier Co., Cedar Falls, Iowa.
Heaver—Furnaces. Danville Stove & Mfg. Co., Danville, Pa.
Heavyduty—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.
Hellite — Refractories. Johns-Manville, New York, N. Y.
Hercules—Furnaces. Johnston Gas Furnace Corp., Los Angeles, Cal.
Hercules—Heavy Duty Furnace. Lennox Furnace Co., Inc., Marshalltown, Ia.
Hercules—Ventilators. Berger Bros. Co., Philadelphia, Pa.
Hermetic—Furnaces. Favorite Mfg. Co., Piqua, O.
Hero—Furnaces. Standard Foundry & Furnace Co., DeKalb, Ill.
Hero—Furnaces, Heaters. J. V. Patten Co., Sycamore, Ill.
Hess — Air-Conditioning Furnaces, Blower-Filter-Washer Combinations, Humidifiers. Hess Warming & Ventilating Co., Chicago, Ill.
Highflex—Belts. B. F. Goodrich Co., Akron, O.
Hitoncast—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.
Hodell—Furnace Chain. Chain Products Co., Cleveland, O.
Hoffman—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.
Hold Heat—Soldering Coppers. Turner Brass Works, Sycamore, Ill.
Hold-Heet—Air Conditioning Units, Controls, Fans, Humidifiers, Humidistats, Motors, Relays, Thermostats, Transformers, Valves. Russell Electric Co., Chicago, Ill.
Holly—Furnaces. Foss Heating & Engineering Co., Pasadena, Cal.
Holtite—Bolts, Rivets, Screws. Continental Screw Co., New Bedford, Mass.
Home—Furnaces. Rock Island Stove Co., Rock Island, Ill.
Home — Weather Strips. Chamberlin Metal Weather Strip Co., Detroit, Mich.
Homekool—Coolers. American Foundry & Furnace Co., Bloomington, Ill.
Hot Blast — Soldering Furnaces and Torches. Turner Brass Works, Sycamore, Ill.
Hotco—Air Conditioning Units, Furnaces, Oil Burners. Hotentot Co., Inc., Omaha, Nebr.
Hot-Kold—Furnaces. Edwards Mfg. Co., Inc., Cincinnati, O.
Hot Spot—Electric Welders. Acme Electric Welder Co., Huntington Park, Cal.
Hot Wave—Coils. Rudy Furnace Co., Dowagiac, Mich.
Hoyt—Conductor Fittings, Roofing. National Lead Co., New York, N. Y.
Huber—Overfeed Stokers. Flynn & Emrich Co., Baltimore, Md.
Humidair—Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.
Humidair—Humidifiers, Washers. American Foundry & Furnace Co., Bloomington, Ill.
Humidiguide—Hygrometer. Taylor Instrument Companies, Rochester, N. Y.
Humidimeter—Indicating, Recording and Testing Instruments. Rochester Mfg. Co., Inc., Rochester, N. Y.
Humiditherm—Indicating, Recording and Testing Instruments. Rochester Mfg. Co., Inc., Rochester, N. Y.
Humiditioner—Air Conditioning Units, Room Type, Winter. Modine Mfg. Co., Racine, Wis.
Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.
Humitherm — Air Conditioning Units, Room Type, Winter and Year Around. Grinnell Co., Inc., Providence, R. I.
Humitrol—Humidity Controls. Lewis Air Conditioners, Inc., Minneapolis, Minn.
Hy-Duty—Wheels, Fans, Blowers. Schwitzer-Cummins Co., Indianapolis, Ind.
Hy-Power—Furnaces. Rudy Furnace Co., Dowagiac, Mich.
Hyro—Dampers, Handles, Punches, Regulators. Parker-Kalon Corp., New York, N. Y.
Hytest—Paint. National Mfg. Co., Tonawanda, N. Y.

I

Iceaire—Portable Cooler. H. S. Kaiser Co., Chicago, Ill.
Icecool—Room Coolers. Betz Unit Air Cooler Co., Kansas City, Mo.
Ice-Fan—Cooler. Modine Mfg. Co., Racine, Wis.
Ice-O-Matic—Compressors. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
Ideal—Air Conditioning Units. Norge Heating & Conditioning Div.—Borg-Warner Corp., Detroit, Mich.
Ideal—Eaves Trough and Gutters, Fittings, Pipe, Roofing, etc. Jas. H. Watson Co., Inc., Bradley, Ill.
Ideal—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.
Ideal—Roofing Nails. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Ideal King—Furnaces. Kansas City Furnace Co., Kansas City, Mo.
Ilgair—Fans. Ilg Electric Ventilating Co., Chicago, Ill.
Ilg-Kold—Air Conditioning Units, Room Coolers. Ilg Electric Ventilating Co., Chicago, Ill.
Illini—Heaters. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Imperial—Hangers. Berger Bros. Co., Philadelphia, Pa.
In-Cel-Wood—Insulation. Cornell Wood Products Co., Chicago, Ill.
Inco—Welding Rod. International Nickel Co., Inc., New York City.
Independent—Grilles, Registers, Ventilators. Independent Register & Mfg. Co., Cleveland, O.
Indian—Furnaces. Rudy Furnace Co., Dowagiac, Mich.
IngAclad—Sheets. Ingersoll Steel & Disc Co., Chicago, Ill.
Interlock—Conductor Pipe. Milcor Steel Co., Milwaukee, Wis.
International—Blowers, Fans. International Engineering, Inc., Dayton, O.
Invisible Joint—Metal Ceilings. Milcor Steel Co., Milwaukee, Wis.
Ironset—Furnace Cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Ironton—Gas Burners, Heaters. Continental Stove Corp., Ironton, O.
Isl City—Registers. Rock Island Register Co., Rock Island, Ill.
Ivco—Ridge Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

J

J-M—Roofing, Insulation. Johns-Manville, New York, N. Y.
J.M.C.—Oil Burners. Johnson Mfg. Co., Waterloo, Iowa.
Janitrol—Gas Burners. Surface Combustion Corp., Toledo, O.
Jennings—Pumps. Nash Engineering Co., South Norwalk, Conn.
Jewel—Furnaces, Heaters, Repairs. Detroit-Michigan Stove Co., Detroit, Mich.
Jiffee—Coils. Hotstream Heater Co., Cleveland, O.
Jointite—Insulation. Mundet Cork Corp., New York, N. Y.
Jordan Aero—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.
Juneaire—Air Conditioning Units, Room Type, Summer, Furnaces. American Foundry & Furnace Co., Bloomington, Ill.
Juniata—Soldering Flux. Geo. W. Diener Mfg. Co., Chicago, Ill.
Junior—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

K

K.S.V.'s—Ventilators. Kernchen Co., Chicago, Ill.
KableKord—Belts. L. H. Gilmer Co., Philadelphia, Pa.
Kaiseraire—Portable Cooler. H. S. Kaiser Co., Chicago, Ill.
Kant Klog—Nozzles. James A. Cannon, Inc., Kansas City, Mo.
Kant Krush — Roof Strainers. Grand Rapids Wire Products Co., Grand Rapids, Mich.
Kelsey-Bradley—Furnaces. Kelsey Heating Co., Syracuse, N. Y.
Kentucky—Eaves Trough and Gutters, Roofing, Sheets. Newport Rolling Mill Co., Newport, Ky.
Keystone — Bolts. Diamond Expansion Bolt Co., Garwood, N. J.
Keystone—Heaters. J. V. Patten Co., Sycamore, Ill.
Keystone—Roofing, Sheets. American Sheet & Tin Plate Co., Pittsburgh, Pa.
Klixon—Controls, Switches, Thermostats. Spencer Thermostat Co., Attleboro, Mass.
Kitchen-aire—Fans. Allen Corp., Detroit, Mich.
Kom-Pak—Filters. Independent Air Filter Co., Chicago, Ill.
Konical—Ventilators. Milcor Steel Co., Milwaukee, Wis.
Kooler-Aire — Blower-Washer Combinations. U. S. Air Conditioning Corp., Minneapolis, Minn.
Koppax—Paint. Koppers Products Co., Pittburgh, Pa.
Kritzer—Bases. Peerless Ice Machine Co., Chicago, Ill.

KruKo—Furnaces. Kruse Co., Inc., Indianapolis, Ind.
Kuehn's—Ridge Rolls and Ridging. Milcor Steel Co., Milwaukee, Wis.
Kwiklok—Humidifier Fittings. Humidity Headquarters, Cleveland, O.
Kwikturn—Humidifier Fittings. Humidity Headquarters, Cleveland, O.

L

L. A.—Motors. Louis Allis Co., Milwaukee, Wis.
L & N—Instruments. Leeds & Northrup Co., Philadelphia, Pa.
L & R—Conductor Pipe. Lamb & Ritchie Co., Cambridge, Mass.
La Condishundaire — Air Conditioning Units. Merrill Co., Inc., Boston, Mass.
Lakeside—Blowers. Furblo Co., Hermansville, Mich.
Lastik Wampum—Cement, Paint. Lastik Products Co., Inc., Pittsburgh, Pa.
Lau — Blowers, Blower-Filter-Washer Combinations. Lau Heating Service, Inc., Dayton, O.
Laurel—Repairs. Detroit-Michigan Stove Co., Detroit, Mich.
Lawson—Heaters. Continental Stove Corp., Ironton, O.
Leader—Oil Burners. Pressure Oil Burners, Inc., York, Pa.
Lead-Seal—Roofing Nails. Deniston Co., Chicago, Ill.
Leadsealed—Sheets. Superior Sheet Steel Co., Canton, O.
Lehigh — Furnaces, Heaters. Pittston Stove Co., Pittston, Pa.
Lennox — Blower-Filter Combinations, Blowers, Furnace & Smoke Pipe Fittings. Lennox Furnace Co., Marshalltown, Ia.
LeRoy—Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.
Liberty—Paint. Carter Paint Co., Liberty, Ind.
Lifetime—Furnace Pipe Fittings & Accessories. Campbell Heating Co., Des Moines, Ia.
Lima-Ward—Stokers. John R. Carnes, Inc., Lima, O.
Lincoln—Furnaces. American Foundry & Furnace Co., Bloomington, Ill.
Linc-Weld—Motors. Lincoln Electric Co., Cleveland, O.
Linoboard—Insulation. Union Fibre Co., Inc., Winona, Minn.
Linofelt—Insulation. Union Fibre Co., Inc., Winona, Minn.
Lipman—Air Conditioning Units, Coils. General Refrigeration Sales Co., Beloit, Wis.
Little Blacksmith—Punches. J. F. Kidder Mfg. Co., Inc., Burlington, Vt.
Llenroc—Fire Doors. Cornell Iron Works, Inc., Long Island City, N. Y.
Lo-Boy—Stokers. Whiting Corp., Harvey, Ill.
Lockjoint—Pipe. Milcor Steel Co., Milwaukee, Wis.
Lornate—Chimney Caps & Tops. W. F. Hirschman Co., Inc., Buffalo, N. Y.
Luco—Acid Brushes, Compounds, Flux, Solder. Thos. F. Lukens Metal Co., Philadelphia, Pa.
Luminall—Paint. National Mfg. Co., Tonawanda, N. Y.
Lumino—Paint. Koppers Products Co., Pittsburgh, Pa.

M

M & E—Compressors, Solder. Merchant & Evans Co., Philadelphia, Pa.
M & H—Zinc. Matthiessen & Hegeler Zinc Co., LaSalle, Ill.
MJL—Flow Instruments. Morey & Jones, Ltd., Los Angeles, Cal.
M-VB—Humidifiers and Fittings. Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
MW—Emancipator—Oil Burners. Motor Wheel Corp., Lansing, Mich.
MW Weather Control—Furnaces. Motor Wheel Corp., Lansing, Mich.
Macheta—Fans and Fan Blades. Aerovent Fan Co., Piqua, O.
Mack—Heaters. J. V. Patten Co., Sycamore, Ill.
Magic—Chimney Caps and Tops. Providence Cornice Co., Providence, R. I.
Majestic — Flashings, Marquise, Skylights, Ventilators, Washers. W. A. Fingles, Inc., Baltimore, Md.
Mark Time—Time Switches. M. H. Rhodes, Inc., New York, N. Y.
Marshall—Air Conditioning Units, Furnaces. Marshall Furnace Co., Marshall, Mich.
Martin—Dampers, Furnaces. Phillips Heating, Ventilating & Mfg. Co., Los Angeles, Cal.
Marvel—Punches. Armstrong-Blum Mfg. Co., Chicago, Ill.
Massachusetts—Blowers, Fans. Bishop & Babcock Sales Co., Cleveland, O.
Master—Cabinet Heaters. Independence Stove & Furnace Co., Independence, Mo.
Master—Controls. White Mfg. Co., St. Paul, Minn.
Master—Stokers. Whiting Corp., Harvey, Ill.
Master Flux—Soldering Flux. J. M. & L. A. Osborn Co., Cleveland, O.
Master Kraft—Oil Burners. Harvey-Whipple, Inc., Springfield, Mass.
Master Stoker—Stokers. Muncie Gear Works, Inc., Muncie, Ind.
Mastoker — Stokers. Sampsel-Mastoker Co., Lafayette, Ind.
Mastr-Lok—Pipe Fittings. Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Maurey—Pulleys. Maurey Mfg. Corp., Chicago, Ill.
Melloblu—Gas Burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Mellow—Furnaces. Liberty Foundry Co., St. Louis, Mo.
Mel-Rock—Air Conditioning Units, Blower Units, Collectors, Fans, Ventilators, Washers. Mellish & Murray Co., Chicago, Ill.
Mercoid—Controls, Valves. Mercoid Corp., Chicago, Ill.
Metalace—Registers. American Foundry & Furnace Co., Bloomington, Ill.
Metallation—Insulation. Reynolds Corp., New York, N. Y.
Metallite—Paint. Glidden Co., Cleveland, O.
Meteor—Furnaces, Heaters. Thatcher Co., Newark, N. J.
Met-L-All—Weather Strips. Metal Products Co., Cincinnati, O.
Meyer—Air Conditioning Furnaces, Blower-Filter-Washer Combinations, Coolers, Filters, Furnaces, Humidifiers, Washers. Meyer Furnace Co., Peoria, Ill.
Micromax—Instruments. Leeds & Northrup Co., Philadelphia, Pa.
Midget—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.
Miles—Furnace Fans. Air Controls, Inc., Cleveland, O.
Miles, Jr.—Propeller Furnace Fans. Henry Furnace & Foundry Co., Cleveland, O.
Milwaukee — Ventilators. Milcor Steel Co., Milwaukee, Wis.
Minfelt—Insulation. Mineral Felt Co., Toledo, O.
Minnemeyer—Fittings. LaCrosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Mistoil—Oil Burners. Wayne Oil Burner Corp., Fort Wayne, Ind.
Mistolator—Oil Burners, Automatic Burner Corp., Chicago, Ill.
Model—Cabinet Heaters. Independence Stove & Furnace Co., Independence, Mo.
Model—Furnaces, Heaters. Home Stove Co., Indianapolis, Ind.
Model A—Furnaces, Heaters. Williamson Heater Co., Cincinnati, O.
Moderator—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.
Modern—Stokers. Link Belt Co., Chicago, Ill.
Modern Hearth — Furnaces. Thompson Mfg. Co., Denver, Colo.
Modernistic—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.
Moditherm—Air Conditioning Units, Clarage Fan Co., Kalamazoo, Mich.
Modutrol—Controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moistair Blended Iron—Furnaces. Round Oak Co., Dowagiac, Mich.
Moistair Boiler Plate—Furnaces. Round Oak Co., Dowagiac, Mich.
Monarch—Furnaces. Kruse & Dewenter Co., Indianapolis, Ind.
Monarch—Furnaces. Stratton & Terstegge Co., Louisville, Ky.
Monarch—Nozzles. Monarch Mfg. Works, Inc., Philadelphia, Pa.
Moncrief—Furnaces, Furnace Repairs, Prefabricated Ducts. Henry Furnace & Foundry Co., Cleveland, O.
Monel—Sheets. International Nickel Co., Inc., New York, N. Y.
Monitor—Furnaces. Marshall Furnace Co., Marshall, Mich.
Monopipe—Furnaces. Lennox Furnace Co., Marshalltown, Ia.
Morning Air—Furnaces. Jackson Sheet Metal Wks., Ogden, Utah.
Moto-Heat—Oil Burners. Brigham Oil Burner Co., St. Louis, Mo.
Multiclone—Collectors. Research Corp., New York, N. Y.
Multi-Panel—Filters. American Air Filter Co., Inc., Louisville, Ky.
Multi-V—Filters. Staynew Filter Corp., Rochester, N. Y.
Munro—Pipe. Martin Bros., Rochester, N. Y.

N

Nairoil—Oil Burners. National Airoil Burner Co., Philadelphia, Pa.
National—Air Conditioning Units, Blowers and Blower Units, Fans, Furnaces, Washers. P. H. MaGirl Foundry & Furnace Wks., Bloomington, Ill.
National—Damper Clips and Tips. U. S. Register Co., Battle Creek, Mich.
National—Furnace Repairs. National Fdry. & Furnace Co., Dayton, O.
National—Furnaces, Heaters. Excelsior Stove & Mfg. Co., Quincy, Ill.
Natroco—Paint. National Mfg. Corp., Tonawanda, N. Y.
NaturZone—Insulation. Wilson & Co., Inc., Chicago, Ill.
Neal—Register Shields. Hall-Neal Furnace Co., Indianapolis, Ind.
Nelson-Bertossa — Air Conditioning Units, Furnaces. Nelson Co., Detroit, Mich.
Nelson — Stokers. Heating Assurance, Inc., Spokane, Wash.
Nesbit—Furnaces. Standard Furnace & Supply Co., Omaha, Nebr.
Nesbitt—Heaters. American Blower Corp., Detroit, Mich.
Nev-A-Rust—Paint. The Glidden Co., Cleveland, O.
Never-Slip—Conductor Fittings. La Crosse Steel Roofing & Corrugating Co,. La Crosse, Wis.
Newark—Furnaces. May-Fiebeger Co., Newark, O.
New Cyclone—Blow Pipe Collectors. Kirk & Blum Mfg. Co., Cincinnati, O.
New Gibraltar—Furnaces, Heaters. P. H. MaGirl Foundry & Furnace Wks., Bloomington, Ill.
Newmanco—Kalamein Doors, Grilles, Structural Shapes. Newman Brothers, Inc., Cincinnati, O.
New Meteor—Furnaces. Thatcher Co., Newark, N. J.
Newport—Instruments. Johnson Tool Co., Inc., East Providence, R. I.
New President—Furnaces, Heaters. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Niagara—Air Conditioning Units, Furnaces. Forest City Foundries Co., Cleveland, O.
Niagara—Metal Workers' Machinery and Tools. Niagara Machine & Tool Works, Buffalo, N. Y.
Nitroil—Nozzles. Hubbard Co., Minneapolis, Minn.
Noel—Welders. Ideal Electric & Mfg. Co., Mansfield, O.
Nokol—Oil Burners. Petroleum Heat & Power Co., Stamford, Conn.

Non-Con-Dux—Cement, Insulation. Grant Wilson, Inc., Chicago, Ill.
No Noize—Blowers. American Foundry & Furnace Co., Bloomington, Ill.
Norco—Furnaces, Furnace Cement, Pipe and Fittings, Registers and Grilles, Air Conditioning, Tank Heaters, Stoves, etc. Northwestern Stove Repair Co., Chicago, Ill.
Northern-Breeze—Room Coolers. Chicago Pump Co., Chicago, Ill.
Northland—Heaters. J. V. Patten Co., Sycamore, Ill.
Northwestern—Furnaces. Western Furnaces, Inc., Tacoma, Wash.
Nor'wester—Blowers. Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Norwol—Insulation. Norristown Magnesia & Asbestos Co., Norristown, Pa.
No-Sag—Register Shields. Pentecost & Craft Co., Terre Haute, Ind.
No Streak—Registers. Rock Island Register Co., Rock Island, Ill.
Novoid—Aluminum Paint, Insulation. Cork Import Corp., New York, N. Y.
Nu-Air—Air Conditioning Units, Room Type, Summer and Year Around, Fans. Meier Electric & Machine Co., Indianapolis, Ind.
Nu-Air—Ventilators. Milcor Steel Co., Milwaukee, Wis.
Nu-Dry—Furnace Cement. Pyrolite Products Co., Cleveland, O.
Nu-Notch—Ventilators. Knowles Mushroom Ventilator Co., New York, N. Y.

O

Oakland — Furnaces. Oakland Furnace Co., Belleville, Ill.
Oilfyre—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.
Oil Master—Furnaces. Round Oak Co., Dowagiac, Mich.
Oil-O-Matic—Oil Burners. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
Olympic—Furnaces. Washington Stove Works, Everett, Wash.
OnIxed—Insulation. Owens-Illinois Glass Co., Newark, O.
Open Dome—Furnaces. American Furnace & Foundry Co., Milan, Mich.
Orient—Furnaces. Smuck-Thiele Co., Indianapolis, Ind.
Ortho-Clime—Air Conditioning Units, Room Type, Summer, Winter and Year Around. Fairbanks, Morse & Co., Chicago, Ill.
Oshkosh—Stokers. Leach Co., Oshkosh, Wis.
OutOWall—Registers. Rock Island Register Co., Rock Island, Ill.
Ovaltube—Gas Burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Oxweld—Welding Apparatus. Linde Air Products Co., New York, N. Y.
Ozite—Duct Insulation. American Hair & Felt Co., Chicago, Ill.

P

P. & H.—Motors. Harnischfeger Corp., Milwaukee, Wis.
P. & H. Hansen—Arc Welders. Harnischfeger Corp., Milwaukee, Wis.
Pacifelt—Insulation. Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Pacific—Furnaces. W. W. Rosebraugh Co., Salem, Ore.
Pacific Breeze—Fans. Pryne & Co., Inc., Los Angeles, Cal.
Palco Bark—Insulation. Pacific Lumber Co., San Francisco, Cal.
Paramount—Flashings. Rochester Lead Works, Inc., Rochester, N. Y.
Parco—Skylight Lifts. Park City Cornice Works, Inc., Bridgeport, Conn.
Parker-Kalon—Nails, Screws. Parker-Kalon Corp., New York, N. Y.
Parkspray—Air Conditioning Units. Parks-Cramer Co., Fitchburg, Mass.
Patrola—Heaters. J. V. Patten Co., Sycamore, Ill.
Patterson—Roofing Clips. American Sheet Metal Works, New Orleans, La.
Pebble—Grilles. American Foundry & Furnace Co., Bloomington, Ill.
Pebble—Registers. Auer Register Co., Cleveland, O.
Peerless — Blower-Filter Combinations, Controls, Fans, Motors, Ventilators. Peerless Electric Co., Warren, O.
Peerless—Blowers, Collectors, Washers. New York Blower Co., Chicago, Ill.
Peerless—Eaves Trough Hangers. Abbott Mfg. Co., Painesville, O.
Peninsular — Repairs. Detroit-Michigan Stove Co., Detroit, Mich.
Penn-Mont—Slate. Structural Slate Co., Pen Argyl, Pa.
Penntrol—Controls. Penn Electric Switch Co., Des Moines, Iowa.
Perfect—Furnaces, Humidifiers, Washers. Richardson & Boynton Co., New York, N. Y.
Perfect—Wire Cloth. Ludlow-Saylor Wire Co., St. Louis, Mo.
Perfect-Fit—Metal Ceilings. Milcor Steel Co., Milwaukee, Wis.
Perry—Damper Clips. Griswold Mfg. Co., Erie, Pa.
Petro—Oil Burners. Petroleum Heat & Power Co., Stamford, Conn.
Pexto—Metal Workers' Machines and Tools. Peck, Stow & Wilcox Co., Southington, Conn.
Pfeifer—Roofing Clips. Berger Bros. Co., Philadelphia, Pa.
Phaeton—Heaters. Excelso Products Corp., Buffalo, N. Y.
Pioneer—Air Conditioning Units, Furnaces, Oil Burners, Room Coolers. Scott-Newcomb, Inc., St. Louis, Mo.
Pittston—Furnaces. Pittston Stove Co., Pittston, Pa.
Pleasant Home—Furnaces. Peerless Foundry Co., Inc., Indianapolis, Ind.
Plexiform—Blowers. Bayley Blower Co., Milwaukee, Wis.
Porcelite—Tile. Columbian Enameling & Stamping Co., Inc., Terre Haute, Ind.
Portage—Furnaces. XXth Century Heating & Ventilating Co., Akron, O.
Power King—Drills. Portable Power Tool Corp., Warsaw, Ind.
Premier—Arc Welding Electrodes, Welding Rod. American Steel & Wire Co., Chicago, Ill.
Premier—Furnace Vacuum Cleaner. Electric Vacuum Cleaner Co., Inc., Cleveland, O.
Premier—Weather Strips. American Metal Weather Strip Co., Grand Rapids, Mich.
Probert—Kalamein Doors. California Cornice Works, Inc., Los Angeles, Cal.
Protection—Soldering Furnaces, Torches. Clayton & Lambert Mfg. Co., Detroit, Mich.
Protectomotor—Filters. Staynew Filter Corp., Rochester, N. Y.
Pure-Air—Furnaces. Enterprise Boiler & Tank Works, Inc., Chicago, Ill.
Pyrofelt—Insulation. Mineral Felt Co., Toledo, O.
Pyrostat—Stoker Switch. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pfening—Solenoid Valves. Columbus Humidifier Co., Columbus, O.
Plastikon—Glazing Compounds. B. F. Goodrich Co., Akron, O.
Plastoid—Compounds, Furnace Cement. Plastic Products Co., Detroit, Mich.
Power—Flat Belts. J. E. Rhoads & Sons, Philadelphia, Pa.
Prest-O-Lite — Oxy-Acetylene Welding Equipment. Linde Air Products Co., New York, N. Y.
Prest-O-Weld — Oxy-Acetylene Welding Equipment. Linde Air Products Co., New York, N. Y.
Progress—Heaters. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Protector—Snow Guards. David Levow, New York, N. Y.
Purox—Oxy-Acetylene Welding Equipment. Linde Air Products Co., New York, N. Y.

Q

Quaker City—Fittings and Accessories, Conductor, Eaves Trough and Gutter, Pipe. Berger Bros. Co., Philadelphia, Pa.
Queen—Furnaces. International Heater Co., Utica, N. Y.
Quick Cleaner—Furnace Brushes. Pilley Packing & Flue Brush Mfg. Co., St. Louis, Mo.
Quiet May—Oil Burners. May Oil Burner Corp., Baltimore, Md.

R

R. & G.—Cold Air Faces, Grilles, Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
R & M—Gas Burners, Fans, Motors, Ventilators. Robbins & Myers, Inc., Springfield, O.
R.M.C.—Burners. Rotary Mfg. Co., Los Angeles, Cal.
R-S—Blast Gates, Controls, Gas and Oil Burners, Valves. R-S Products Corp., Philadelphia, Pa.
Rainbow Mist—Nozzles. Peterson Freezem Mfg. Co., Kansas City, Mo.
Real Host—Oil Burners. Harry C. Weiskittel Co., Inc., Baltimore, Md.
Red Devil—Cement. Pecora Paint Co., Philadelphia, Pa.
Redox—Paint. Thompson & Co., Pittsburgh, Pa.
Red Spindle—Dampers. Stover Mfg. & Engine Co., Freeport, Ill.
Red Top — Insulation. Owens-Illinois Glass Co., Newark, O.
Red Top—Insulation. United States Gypsum Co., Chicago, Ill.
Reed—Filters. American Air Filter Co., Inc., Louisville, Ky.
ReFreshaire—Winter Air Conditioning Units, Room Type. Summerheat Co., South Bend, Ind.
Rego—Oxy-Acetylene Welding Equipment Torches. Bastian-Blessing Co., Chicago, Ill.
Relay—Filters. W. R. Ripley Co., Tacoma, Wash.
Renu—Filters. American Air Filter Co., Inc., Louisville, Ky.
Republic—Gas Conversion Burners. Autogas Corp., Chicago, Ill.
Republic—Steel Products. Republic Steel Corp., Cleveland, O.
Rex—Furnace Brushes and Vacuum Cleaners. Carl E. Swift Corp., Holland, Mich.
Rex—Furnaces. Calkins & Pearce, Columbus, O.
Rexoil—Oil Burners. Reif-Rexoil, Inc., Buffalo, N. Y.
Rival—Copper and Zinc Straps. David Levow, New York, N. Y.
Riverside—Furnaces. Rock Island Stove Co., Rock Island, Ill.
Robinson—Sheet Metal Machines. New Albany Machine Mfg. Co., New Albany, Ind.
Rocktex—Insulation. Philip Carey Co., Lockland, Cincinnati, O.
RockWool—Insulation. Mineral Insulation Co., Chicago Ridge, Ill.
Rockwool—Insulation. Union Fibre Co., Inc., Winona, Minn.
Rohaco—Blowers and Blower Units, Furnace, Smoke and Stove Pipe Fittings and Accessories, Grilles, Pipe, Registers, Heat Savers. Roberts-Hamilton Co., Minneapolis, Minn.
Roofkoter—Paint. Tropical Paint & Oil Co., Cleveland, O.
Roto-Blast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.
Rotojet—Nozzles. Binks Mfg. Co., Chicago, Ill.
Royal—Furnaces, Heaters. Hart & Crouse, Co., Inc., Utica, N. Y.
Royal—Paint, Cement. A. Wilhelm Co., Reading, Pa.
Royalair — Blower-Filter Combinations, Furnaces. Rock Island Stove Co., Rock Island, Ill.
Rubalt—Paint. Alfred Hague & Co., Inc., Brooklyn, N. Y.
Rubyfluid—Solder, Soldering Flux, Tinning Compounds. Ruby Chemical Co., Columbus, O.

S

S.A.C.—Air Conditioning Units, Room Type, Summer, Winter, Year Around. Standard Air Conditioning, Inc., New York, N. Y.

S-C—Furnaces, Heaters, Valves. Surface Combustion Corp., Toledo, O.
SF—Arc Welding Electrodes, Oxy-Acetylene Welding Equipment, Soldering Coppers and Flux, Torches, Welding Rod. Sight Feed Generator Co., Richmond, Ind.
S-N—Air Conditioning Units. Scott-Newcomb, Inc., St. Louis, Mo.
Safekote—Shingles. Ruberoid Co., New York, N. Y.
Saftrol—Controls. Penn Electric Switch Co., Des Moines, Iowa.
Saf-T-Stat — Controls. Stat-Amatic Instrument & Appliance Co., Hartford, Conn.
St. Louis—Stoker. Ormsby-Gray, St. Louis, Mo.
Salmo—Cement, Insulation, Pipe Coverings. Sall Mountain Co., Chicago, Ill.
Samco—Cement. Standard Asbestos Mfg. Co., Chicago, Ill.
Sanidaire—Humidifiers. U. S. Air Conditioning Corp., Minneapolis, Minn.
Sanitary—Furnaces. Smuck-Thiele Co., Indianapolis, Ind.
Satis-Fyre—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.
Schmidt—Soldering and Brazing Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Scruplex—Ventilators. L. J. Wing Mfg. Co., New York, N. Y.
Seal of Quality—Roofing. Columbia Steel Co., San Francisco, Cal.
Seamless—Furnaces, Heaters. Waterman-Waterbury Co., Minneapolis, Minn.
Security—Pipe, Ventilators. Follansbee Bros. Co., Pittsburgh, Pa.
Security — Roofing, Shingles. National Mfg. Corp., Tonawanda, N. Y.
Self-Cleaning—Furnaces. Moore Corp., Joliet, Ill.
Selflock—Furnace Pipe Fittings and Accessories. Milcor Steel Co., Milwaukee, Wis.
Sevarge—Stokers. Model Mfg. Co., Richmond, Va.
Shield-Arc—Welders. Lincoln Electric Co., Cleveland, O.
Shower-Proof—Paint. Calbar Paint & Varnish Co., Philadelphia, Pa.
Shur-Grip—Handles. Parker-Kalon Corp., New York, N. Y.
Shur-Lock—Pipe. Berger Bros., Co., Philadelphia, Pa.
Sidney—Domestic Stokers. Stoker Equipment Co., Sidney, O.
Silcrome—Sheets. Ludlum Steel Co., Watervliet, N. Y.
Silent—Furnace Blowers; Air Conditioning Units. Air Conditioning Equipment Corp., Minneapolis, Minn.
Silentair—Air Conditioning Units, Blowers, Filters, Washers. Gehri Co., Tacoma, Wash.
Silentblu—Gas Burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Sil-Fos—Welding Rod. Handy & Harmon, New York, N. Y.
Silvercote—Insulation. Milcor Steel Co., Milwaukee, Wis.
Simplex—Humidifiers. Henry Kraker, Holland, Mich.
Simplex—Humidifiers. Sallada Mfg. Co., Minneapolis, Minn.
Simplex—Oil Burners. Pan American Engineering Corp., Ltd., Berkeley, Cal.
Simplex—Stoker. Stoker Products, Inc., Decatur, Ill.
Simplex—Tank Gages. Viking Pump Co., Cedar Falls, Iowa.
Simplex—Weather Strips. American Metal Weather Strip Co., Grand Rapids, Mich.
Sirocco—Air Conditioning Units, Room Type, Summer, Winter and Year Around; Blowers, Coils, Fans, Grilles, Nozzles, Washers, Wheels. American Blower Corp., Detroit, Mich.
Skuttle—Humidifiers. J. L. Skuttle Co., Dowagiac, Mich.
Smalmesh—Metal Lath. Milcor Steel Co., Milwaukee, Wis.
Snaplok—Pipe. Reeves Mfg. Co., Dover, O.
Snug-Fit—Coils. Hotstream Heater Co., Cleveland, O.
Solar—Furnaces. American Foundry & Furnace Co., Bloomington, Ill.
Solar Heat—Furnaces. Thatcher Co., Newark, N. J.
Solid Comfort—Furnaces. May-Fiebeger Co., Newark, O.
Soroco—Blow Pipe Collectors, Chimney Caps and Tops, Pipe, Roofers' Kettles and Mop Heads, Sheet Metal Ornaments. Southbridge Roofing Co., Inc., Southbridge, Mass.
Sound Stopper—Sound Isolation. Humidity Headquarters, Cleveland, O.
Special—Heaters. Waterman-Waterbury Co., Minneapolis, Minn.
SpecO—Soldering Flux. Pfanstiehl Chemical Co., Waukegan, Ill.
Spee Dee—Coils. Air Controls, Inc., Cleveland, O.
Spee-Dee-Heet—Fans. Williamson Heater Co., Cincinnati, O.
Sphinx—Burners, Furnaces, Humidifiers. C. L. Bryant Corp., Cleveland, O.
Spider Web—Filters. Wilson & Co., Inc., Chicago, Ill.
Spraymaker—Humidifiers. Lennox Furnace Co., Marshalltown, Iowa.
Springair—Air Conditioning Units. S. M. Howes Co., Charlestown, Boston, Mass.
Square Steel—Heaters. Waterman-Waterbury Co., Minneapolis, Minn.
Stable-Arc—Arc Welders. Lincoln Electric Co., Cleveland, O.
Stamco—Furnace Pipe, Fittings. Cincinnati Stamping Co., Cincinnati, O.
Standard—Furnaces. Aladdin Heating Corp., Oakland, Cal.
Standard—Furnaces. Home Furnace Co., Holland, Mich.
Standard—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.
Star—Furnaces. Arcweld Mfg. Co., Inc., Seattle, Wash.
Star—Solder. Eagle-Picher Lead Co., Cincinnati, O.
Star—Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.
Star—Ventilators. Merchant & Evans Co., Philadelphia, Pa.
States—Time Switches. Stat-Amatic Instrument & Appliance Co., Hartford, Conn.
Staynew—Filters. Staynew Filter Corp., Rochester, N. Y.
Stayrib—Metal Lath. Milcor Steel Co., Milwaukee, Wis.
Stearns—Registers. Springman Metal Specialty Co., Detroit, Mich.
Steelheet—Furnaces. Quist Furnace & Mfg. Co., Milwaukee, Wis.
Ster-Na-Man—Smoke Pipe Fittings and Accessories. A. G. Brauer Supply Co., St. Louis, Mo.
Stewart—Furnaces. Fuller-Warren Co., Milwaukee, Wis.
Stil-Blade—Fans. C. A. Stilphen Engineering & Mfg. Co., Denver, Colo.
Stoker-Ola—Stokers. Advance Appliance Co., Peoria, Ill.
Stoker "X"—Stokers. Perfectaire Corp., Baltimore, Md.
Stokol—Stokers. Schwitzer-Cummins Co., Indianapolis, Ind.
Storm-King—Furnaces. Roberts-Hamilton Co., Minneapolis, Minn.
Stowe—Stokers. Johnston & Jennings Co., Cleveland, O.
Streamaire—Coils. Young Radiator Co., Racine, Wis.
Stronghold—Flat belts. J. E. Rhoads & Sons, Philadelphia, Pa.
Success—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.
Summer Comfort—Ventilating Fans. Air Controls, Inc., Cleveland, O.
Sunbeam—Furnaces, Heaters. Fox Furnace Co., Elyria, O.
Sunglow—Furnaces. Moore Corp., Joliet, Ill.
Sunnyaire—Heaters. Texo Sales & Mfg. Co., Cincinnati, O.
Sunrise—Oil Burners. Kais Sunrise Works, Detroit, Mich.
Super—Fans. Holtum Mfg. Co., Freeport, Ill.
Super—Roof Flashing. Eagle-Picher Lead Co., Cincinnati, O.
Superfex—Air Conditioning Units, Oil Burners, Furnaces, Heaters. Perfection Stove Co., Cleveland, O.
Super Heaters—Furnaces. P. H. MaGirl Foundry & Furnace Works, Bloomington, Ill.
Superior—Air Conditioning Units, Furnaces. Pacific Gas Radiator Co., Huntington Park, Cal.
Superior—Blowers, Fans, Filters, Ventilators. American Foundry & Furnace Co., Bloomington, Ill.
Superior—Furnaces. Richardson & Boynton Co., New York, N. Y.
Super Suction—Furnace Vacuum Cleaners. National Super Service Co., Toledo, O.
Supreme—Furnaces. American Furnace & Foundry Co., Milan, Mich.
Supreme—Furnaces, Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.
Surelok—Pipe. Reeves Mfg. Co., Dover, O.
Surety—Furnaces. "Home Comfort" Furnace & Mfg. Co., St. Louis, Mo.
Symonds — Registers. Liberty Foundry Co., St. Louis, Mo.
Syox—Registers. Liberty Foundry Co., St. Louis, Mo.
Syphon-Air—Ventilators. F. Meyer & Bro. Co., Peoria, Ill.

T

TEC—Stokers. Taylor Equipment Co., Cincinnati, O.
Tag—Controls, Instruments, Thermostats, Valves. C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.
Tamco—Ventilators, Wood Faces. Tiffin Art Metal Co., Tiffin, O.
Tannate—Flat Belts. J. E. Rhoads & Sons, Philadelphia, Pa.
Tatroweld—Arc Welders. Tatro Brothers, Inc., Decorah, Iowa.
Taylor—Stokers. American Engineering Co., Philadelphia, Pa.
Tel Tru—Instruments. E. V. Hill Co., Chicago, Ill.
Temlok—Insulation. Armstrong Cork Products Co., Lancaster, Pa.
Tempered-Aire—Furnaces. Gar Wood Industries, Inc., Detroit, Mich.
Temtrol—Thermostats. Penn Electric Switch Co., Des Moines, Iowa.
Tenax—Expansion Bolts. Diamond Expansion Bolt Co., Garwood, N. J.
Texrope—V-Belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Thermair—Furnaces. New York Blower Co., Chicago, Ill.
Thermidaire—Air Conditioning Units, Room Type, Summer. E. K. Campbell Heating Co., Kansas City, Mo.
Thermo—Blower-Filter Units, Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermoaire—Air Conditioners. Peerless Electric Co., Warren, O.
Thermofill—Insulation. United States Gypsum Co., Chicago, Ill.
Thermofin—Heaters. Grinnell Co., Inc., Providence, R. I.
Thermolator—Heaters. Pacific Gas Radiator Co., Huntington Park, Cal.
Thermolier—Air Conditioning Units, Room Type, Summer. Grinnell Co., Inc., Providence, R. I.
Thor—Drills. Independent Pneumatic Tool Co., Chicago, Ill.
Thread-Forming — Screws. Continental Screw Co., New Bedford, Mass.
370—Paints. Thompson & Co., Pittsburgh, Pa.
Thriftsteel—Furnaces. Round Oak Co., Dowagiac, Mich.
Throway—Filters. American Air Filter Co., Inc., Louisville, Ky.
Thurmus—Furnaces. McPherson Furnace & Supply Co., Portland, Ore.
Tightcote—Sheets. Edwards Mfg. Co., Inc., Cincinnati, O.
Tik Wheat—Pipe Covering Paste. Clark Stak-O Corp., Rochester, N. Y.
Tilath—Metal Lath. Milcor Steel Co., Milwaukee, Wis.
Tillers-all-Welded — Furnaces. Iowa Foundry Co., Sioux City, Iowa.
Timetrol—Switches. Penn Electric Switch Co., Des Moines, Iowa.
Tin-Ezy—Soldering Flux. Alumaweld Co. of America, Chicago, Ill.
Tin Loy—Tinning Compounds. Eagle-Picher Lead Co., Cincinnati, O.
Tinol—Flux. American Solder & Flux Co., Philadelphia, Pa.

Titan—Furnaces. Standard Fdry. & Furnace Co., DeKalb, Ill.
Titelock—Furnace Pipe, Fittings and Accessories, Pipe, Roofing, Shingles. Milcor Steel Co., Milwaukee, Wis.
Tobin Bronze—Welding Rod. American Brass Co., Waterbury, Conn.
Toncan—Plates, Ridge Rolls and Ridging, Roofing, Sheets. Republic Steel Corp., Cleveland, O.
Toridheet—Oil Burners. Cleveland Steel Products Corp., Cleveland, O.
Tornado—Furnace Vacuum Cleaners. Breuer Electric Mfg. Co., Chicago, Ill.
Torpedo—Skylights. Milcor Steel Co., Milwaukee, Wis.
Torrid—Soldering Furnaces and Torches. Geo. W. Diener Mfg. Co., Chicago, Ill.
Torrid Gas—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Torrid Zone—Furnaces, Heaters. Lennox Furnace Co., Marshalltown, Ia.
Transite—Pipe. Johns-Manville, New York, N. Y.
Trembar—Motor Bases. United States Gypsum Co., Chicago, Ill.
Triplex—Furnaces. Home Furnace Co., Holland, Mich.
Tripl-ife—Furnaces. Williamson Heater Co., Cincinnati, O.
Tropic Gas—Heaters. Beck Engineering Combustion Kompany, St. Louis, Mo.
Tropico—Furnaces. Lennox Furnace Co., Marshalltown, Ia.
Tropico—Humidifiers. Roberts-Hamilton Co., Minneapolis, Minn.
Turbo—Washers. Bayley Blower Co., Milwaukee, Wis.
Tymit—Time Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

U

U. S.—Blowers. J. K. Mohler Co., Ephrata, Pa.
U. S.—Faces, Fittings, Grilles, Registers. U. S. Register Co., Battle Creek, Mich.
U. S. AircO—Blowers, Washers. U. S. Air Conditioning Corp., Minneapolis, Minn.
U. S. All Steel—Furnaces. U. S. Pressed Steel Products Co., Kalamazoo, Mich.
U. S. G.—Roof Cement, Roofing. United States Gypsum Co., Chicago, Ill.
U. S. S.—Sheets. American Sheet and Tin Plate Co., Pittsburgh, Pa.
U-Loy—Sheets. Republic Steel Corp., Cleveland, O.
Uncle Sam—Smoke Pipe Dampers. Berger Bros. Co., Philadelphia, Pa.
Uniblade—Blowers. Autovent Fan & Blower Co., Chicago, Ill.
Unicool—Air Conditioning Units, Room Type, Summer, Winter, Year Around, Washers. Betz Unit Air Cooler Co., Kansas City, Mo.
Unilectric—Fans. Midwest Ventilating Works, Milwaukee, Wis.
Unishear—Power Shears. Stanley Works, New Britain, Conn.
Unitor—Cabinet Heaters. American Gas Products Corp., New York, N. Y.
Universal—Air Filters. Hugo Mfg. Co., Duluth, Minn.
Universal—Blowers. Universal Blower Co., Birmingham, Mich.
Universal—Blowers, Fans. Ilg Electric Ventilating Co., Chicago, Ill.
Universal—Gages. Rochester Mfg. Co., Inc., Rochester, N. Y.
Universal—Hand Snips and Shears. Rupp Forge & Shear Co., Cleveland, O.
Universal—Heaters. John J. Nesbitt, Inc., Philadelphia, Pa.
Universal—Oil Burners. Morey & Jones, Ltd., Los Angeles, Cal.
Unxld—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.
Upson—Rivets. Republic Steel Corp., Cleveland, O.
Utility—Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

V

Vac-u-Clean—Furnace Cleaners. Williamson Heater Co., Cincinnati, O.
Vacu-Draft—Blowers. Muncie Gear Works, Inc., Muncie, Ind.
Valley Forge—Cement. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Vaporator—Humidifiers. Rudy Furnace Co. Dowagiac Mich.
Variflow—Blades. Servel Inc., Evansville, Ind.
Venetian—Grilles. Waterloo Register Co., Waterloo, Iowa.
Ventura—Fans, Ventilators. American Blower Corp., Detroit, Mich.
Vernalloy—Furnace Metal. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Vernois—Coils, Furnaces, Heaters. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Verson—Brakes, Punches. Allsteel Press Co., Inc., Chicago, Ill.
Vibracork—Bases. Armstrong Cork Products Co., Lancaster, Pa.
Victor—Air Conditioning Units, Blower-Filter Units, Furnaces. Hall-Neal Furnace Co., Indianapolis, Ind.
Victor—Blowers, Fans, Motors. Victor Electric Products, Inc., Cincinnati, O.
Victor—Regulators. Safe Automatic Heat Control Co., Detroit, Mich.
Victoraire—Air Conditioning Furnaces. Hall-Neal Furnace Co., Indianapolis, Ind.
Victory—Oil Burners. Caloroil Burner Corp., Hartford, Conn.
Vigor-Aire—Controls, Humidifiers. Merion Sporting Goods Mfg. Corp., Philadelphia, Pa.
Vik-Air Conditioner—Air Conditioning Units, Blower Units. Viking Air Conditioning Corp., Cleveland, O.
Vik-Air Humidifier—Humidifiers. Viking Air Conditioning Corp., Cleveland, O.
Vortex—Furnace Vacuum Cleaners. B. F. Sturtevant Co., Hyde Park, Boston, Mass.
Vulcanite—Roofing, Roofing Cement. Certain-teed Products Corp., New York, N. Y.
Vulcatex—Caulking and Glazing Compounds. A. C. Horn Co., Long Island City, N. Y.
Vulco—Flat and V-type Belts. Gates Rubber Co., Denver, Colo.

W

Wafer—Filters. American Air Filter Co., Inc., Louisville, Ky.
Walsh—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Walworth—Faces, Registers. Forest City Foundries Co., Cleveland, O.
Ward—Furnaces, Heaters. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Warm Friend—Furnaces. Thatcher Co., Newark, N. J.
Watcocell—Pipe Covering. Ruberoid Co., New York, N. Y.
Waterbase—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.
Water-Boy—Float Valves. Maid-O'-Mist, Inc., Chicago, Ill.
Waterbury—Air Conditioning Furnaces and Units, Blower-Filter-Washer Combinations, Furnaces, Heaters. Waterman-Waterbury Co., Minneapolis, Minn.
Waterseal—Cement, Paint. Thompson & Co., Pittsburgh, Pa.
Watson—Furnaces. Floral City Co., Monroe, Mich.
Wayne-Bard—Air Conditioning Units, Furnaces. Wayne Oil Burner Corp., Fort Wayne, Ind.
Weathercote—Paint. The Glidden Co., Cleveland, O.
Weathermaker—Air Conditioning Units; Room Type, Summer, Winter and Year Around, Blower Units, Furnaces. Carrier Engineering Corp., Newark, N. J.
Weather Master—Air Conditioning Units. U. S. Pressed Steel Products Co., Kalamazoo, Mich.
Weather Robot—Air Conditioning Units. Peerless Electric Co., Warren, O.
Weatherwood—Insulation. United States Gypsum Co., Chicago, Ill.
Wedgbelt—V Belts. American Pulley Co., Philadelphia, Pa.
Weir—Air Conditioning Units, Furnaces, Heaters. Meyer Furnace Co., Peoria, Ill.
Weisco—Skylight Lifts. H. Weiss & Co., New York, N. Y.
Welco—Electrodes, Arc Welders, Welding Rod. Welding Service Sales, Inc., San Francisco, Cal.
Weldomatic—Electric Welders. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wesco—Furnaces. John Westwick & Son, Inc., Galena, Ill.
Western King—Furnaces. Independence Stove & Furnace Co., Independence, Mo.
Westrite—Furnaces. Western Furnaces, Inc., Tacoma, Wash.
Wheco—Oil Burners. Westchester Home Equipment Co., Inc., Bronx, N. Y.
White Flash—Electrodes. Central Steel & Wire Co., Chicago, Ill.
Whitney—Stokers. Apex Tool Co., Inc., Bridgeport, Conn.
Wiechert—Furnaces. St. Clair Foundry Corp., Centralia, Ill.
Wildergloss—Smoke and Stove Pipe and Fittings. Wilder Metal Co., Niles, O.
Wilson—Arc Welders. Air Reduction Sales Co., New York, N. Y.
Winair—Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.
Wind-O-Vane Jr.—Kitchen Exhaust Fans. B. F. Sturtevant Co., Hyde Park, Mass.
Winner—Registers. Auer Register Co., Cleveland, O.
Winter-Chaser—Air Conditioning Units, Furnaces. Campbell Heating Co., Des Moines, Ia.
Winter King—Furnaces. McPherson Furnace & Supply Co., Portland, Ore.
Wizard—Furnaces. Agricola Furnace Co., Inc., Gadsden, Ala.
Wodcol—Furnaces. W. W. Rosebraugh Co., Salem, Ore.
Wolverine—Air Conditioning Units, Room Type, Summer and Winter. Myco Mfg. Co., Detroit, Mich.
Wolverine—Furnaces. Marshall Furnace Co., Marshall, Mich.
Wolverine—Weather Strips. American Metal Weather Strip Co., Grand Rapids, Mich.

X

XL—Metal Windows. Herrmann & Grace Co., Brooklyn, N. Y.
X-L-All—Furnaces, Heaters. Deshler Foundry & Machine Works, Deshler, O.
Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

Y

Y-B—Blow Pipe Equipment, Diffusers, Louvres. Young & Bertke Co., Cincinnati, O.
Yager's—Flux. Alex R. Benson Co., Inc., Hudson, N. Y.
Yankee—Dampers. S. M. Howes Co., Charlestown, Boston, Mass.
Yoloy—Alloy Plates and Sheets. Youngstown Sheet & Tube Co., Youngstown, O.
York-Lalor—Oil Burners, Regulating Valves. York Oil Burner Co., Inc., York, Pa.

Z

Zephyr Air—Air Conditioning Units. Savage Arms Corp., New York, N. Y.
Zincoat—Sheets. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Z-Ro King—Furnaces. Oakland Foundry Co., Belleville, Ill.

American Artisan

1936 DIRECTORY NUMBER

[Section 3—MANUFACTURERS' ADDRESSES]

A

A-C Mfg. Co., Inc., 417 Sherman Ave., Pontiac, Ill.
A-C Spark Plug Co., Flint, Mich.
Abbott Mfg. Co., Box 150, Painesville, O.
Accurate Mfg. Works, 2432 Milwaukee Ave., Chicago, Ill.
Accurate Metal Weather Strip Co., 216 E. 26th St., New York City.
Ace Engineering Co., 1735 W. 31st St., Chicago, Ill.
Acer & Whedon, Inc., Commercial St., Medina, N. Y.
Acme Electric Welder Co., 5621 Pacific Blvd., Huntington, Park, Cal.
●Acme Heating & Ventilating Co., 4224 S. Lowe Ave., Chicago, Ill.
Acme Refining Co., W. 56th & W. & L. E. Ry., Cleveland, O.
Acme Tin Plate & Roofing Supply Co., 10th & York St., Philadelphia, Pa.
Adams Co,, E. 4th St. Ext., Dubuque, Ia.
●Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago, Ill.
Advance Appliance Co., 112 Washington St., Peoria, Ill.
●Aeolus Dickinson, 3332-52 S. Artesian Ave., Chicago, Ill.
●Aerofin Corp., 850 Frelinghuysen Ave., Newark, N. J.
Aeroil Burner Co., Inc., Park Ave. at 13th St., West New York, N. J.
Aerovent Fan Co., Piqua, O.
Agricola Furnace Co., Inc., North 12th St., Gadsden, Ala.
●Air Conditioning Equipment Corp., 310 W. 33rd St., Minneapolis, Minn.
●Air Controls, Inc., 1935 W. 114th St., Cleveland, O.
Airmaster Corp., 140 S. Dearborn St., Chicago, Ill.
Air Reduction Sales Co., 60 E. 42nd St., New York City.
Airtemp, Inc., 8021 Conant Ave., Detroit, Mich.
Airtherm Mfg. Co., 1474 S. Vandeventer Ave., St. Louis, Mo.
Airven Co., 257 W. 17th St., New York City.
Aladdin Heating Corp., 5107 Broadway, Oakland, Cal.
Alco Valve Co., Inc., 2628 Big Bend Blvd., St. Louis, Mo.
Aldrich Pump Co., Foot of Pine St., Allentown, Pa.
Alexander Bros., Philadelphia, Pa.
Alfol Insulation Co., 1422 Chrysler Bldg., New York City.
Allegheny Steel Co., Brackenridge, Pa.
Allen Corp., 1036 Fourteenth St., Detroit, Mich.
Allen-Bradley Co., 1326 S. Second St., Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Allis Co., Louis, 427 E. Stewart St., Milwaukee, Wis.
Allmetal Weatherstrip Co., 229 W. Illinois St., Chicago, Ill.
All States Roofers Equipment & Material Co., 2107 W. Lake St., Chicago, Ill.
Allsteel Press Co., Inc., 12015 S. Peoria St., Chicago, Ill.
Alter-Arc Mfg. Co., 527 "C" Ave., Lawton, Okla.
Alton Mineral Wool Co., P. O. Box 268, Alton, Ill.
Alumaweld Co. of America, 2442-44 South Parkway, Chicago, Ill.
Aluminum Company of America, 801 Gulf Bldg., Pittsburgh, Pa.
●American Air Filter Co., Inc., 113 Central Ave., Louisville, Ky.
●American Bag & Buff Mfg. Co., 4056 W. Roosevelt Road, Chicago, Ill.
American Blower Corp., 6000 Russell St., Detroit, Mich.
●American Brass Co., 414 Meadow St., Waterbury, Conn.
American Chain Co., Inc., 929 Connecticut Ave., Bridgeport, Conn.
American Coolair Corp., 3604 Mayflower St., Jacksonville, Fla.
American Electric Fusion Corp., 2610 Diversey Ave., Chicago, Ill.
American Engineering Co., Aramingo Ave. & Cumberland St., Philadelphia, Pa.
American Flange & Mfg. Co., Inc., 26 Broadway, New York City.
●American Foundry & Furnace Co., 915 E. Washington St., Bloomington, Ill.
American Furnace Co., 2719-31 Delmar Blvd., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
American Gas Appliance Co., 3945 W. Lake St., Chicago, Ill.
American Gas Products Corp., 40 W. 40th St., New York City.
American Hair & Felt Co., 222 N. Bank Dr., Chicago, Ill.
American-Larson Ventilating Co., 1004 Keystone Bank Bldg., Pittsburgh, Pa.
American Machine Products Co., 207-11 Market St., Marshalltown, Ia.
American Metal Weather Strip Co., 144 N. Division Ave., Grand Rapids, Mich.
American Nickeloid Co., 1505 Second St., Peru, Ill.
American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa.
●American Radiator Co., 40 W. 40th St., New York City.
●American Rolling Mill Co., 730 Curtis Ave., Middletown, O.
American Screw Co., 21 Stevens St., Providence, R. I.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
American Solder & Flux Co., 4519 Wayne Ave., Philadelphia, Pa.
American Steam Pump Co., 60 Capital Ave., N.E., Battle Creek, Mich.
American Sheet Metal Works, 331 N. Alexander, New Orleans, La.
American Steel Co., 1330 Park Bldg., Pittsburgh, Pa.
American Steel & Wire Co., 208 S. La Salle St., Chicago, Ill.
American Wood Register Co., Novelty & Walnut Sts., Plymouth, Ind.
American Zinc Products Co., Greencastle, Ind.
Ames Co., W. R., 150 Hooper St., San Francisco, Cal.
Anchor Post Fence Co., Eastern Ave. & Kane St., Baltimore, Md.
Anchor Stove & Range Co., Third & Culbertson, New Albany, Ind.
Anderson Mfg. Co., 511 3rd, Des Moines, Ia.
Andes Range & Furnace Corp., 117 Evans St., Geneva, N. Y.
Andrews Lead Co., Long Island City, N. Y.
Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, O.
Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y.
Antigo Building Supply Co., Antigo, Wis.
Apex Tool Co., Inc., 50 Remer St., Bridgeport, Conn.
Apollo Steel Co., 609-617 Warren Ave., Apollo, Pa.
Arco Vacuum Corp., 40 W. 40th St., New York City.
Arcweld Mfg. Co., 3469 Third Ave. W., Seattle, Wash.
Arex Co., 333 N. Michigan Ave., Chicago, Ill.
Armstrong-Blum Mfg. Co., 333 N. Francisco Ave., Chicago, Ill.
Armstrong Co., South & Post St., Detroit, Mich.
Armstrong Cork Products Co., 992 Concord St., Lancaster, Pa.
●Armstrong Furnace Co., Columbus, O.
Athens Plow Co., Athens, Tenn.
Atlas Bolt & Screw Co., 1130 Ivanhoe Rd., Cleveland, O.
Atlas Heating & Ventilating Co., Ltd., 557 4th St., San Francisco, Cal.
Atlas Valve Co., 282 South St., Newark, N. J.
Auburn Burner Corp., Auburn, Ind.
Auburn Stoker Co., Auburn, Ind.
●Auer Register Co., 3608 Payne Ave., Cleveland, O.
Autocrat Oil Burner Corp., 100 East Ave., N. W., Cedar Rapids, Ia.
Autogas Corp., 2258 Diversey Ave., Chicago, Ill.
Automatic Burner Corp., 1823 Carroll Ave., Chicago, Ill.
●Automatic Humidifier Co., Cedar Falls, Ia.
Automatic Products Co., 121 N. Broadway, Milwaukee, Wis.
Automatic Reclosing Circuit Breaker Co., Sixth & Indianola Aves., Columbus, O.
Automatic Stoker Corp., Indianapolis, Ind.
Automatic Switch Co., 154 Grand St., New York City.
●Autovent Fan & Blower Co., 1825 N. Kostner Ave., Chicago, Ill.

B

Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh, Pa.
Badger Mfg. Co., 106 N. Frances St., Madison, Wis.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland, O.
Baker Furnace & Cleaner Mfg. Co., 2505 Albion St., Toledo, O.
Baker Ice Machine Co., Inc., 1509 Evans St., Omaha, Nebr.
●Baldor Electric Co., 4358 Duncan Ave., St. Louis, Mo.
Ballard, Inc., Arthur H., 535 Commonwealth Ave., Boston, Mass.
Balloffett Diamond Wire Dies Co., Inc., 15 E. 22nd St., New York City.
Bangor-Washington Slate Co., Bangor, Pa.
Barber Asphalt Co., 1600 Arch St., Philadelphia, Pa.
Barber-Colman Co., River & Loomis Sts., Rockford, Ill.
●Barber Gas Burner Co., 3704 Superior Ave., Cleveland, O.

Bardes Range & Foundry Co., E. H., 2619 Colerain Ave., Cincinnati, O.
Barnes Metal Products Co., 4425 W. 16th St., Chicago, Ill.
Barrett Co., 40 Rector St., New York City.
Barrett Regulation Engineers Co., 1322 Warrensville Center Rd., Cleveland Heights, O.
Barry Furnace Co., N. "B" St., Hamilton, O.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit, Mich.
Bastian-Blessing Co., 240 E. Ontario St., Chicago, Ill.
Bayer Co., A. J., Slauson & Santa Fe Aves., Los Angeles, Cal.
Bayley Blower Co., 1817 S. 66th St., Milwaukee, Wis.
●Bead Chain Mfg. Co., 110 Mountain Grove St., Bridgeport, Conn.
Beatrice Steel Tank Mfg. Co., 700-710 S. 7th St., Beatrice, Nebr.
Beatty Machine & Mfg. Co., 932 150th St., Hammond, Ind.
Beck Engineering Combustion Kompany, 2332-38 Pine St., St. Louis, Mo.
Beckley Perforating Co., 212 North Ave., Garwood, N. J.
Bedard Mfg. Co., 1647 Hennepin Ave., Minneapolis, Minn.
Bell & Gossett Co., 3000 Wallace St., Chicago, Ill.
Bender Warrick Corp., 131 Pierce, Birmingham, Mich.
Bennett Corp., W. M., 1109 Harney St., Omaha, Nebr.
●Benson Co., Inc., Alex R., 1040 S. Bay Rd., Hudson, N. Y.
●Berger Bros. Co., 229-237 Arch St., Philadelphia, Pa.
Berger Co., L. D., 59 N. Second St., Philadelphia, Pa.
●Berger Mfg. Co., Div. of Republic Steel Corp., 1038 Belden Ave., N. E., Canton, O.
Berger Mfg. Div. of Truscon Steel Co., Canton, O.
Bergstrom Mfg. Co., Neenah, Wis.
Bernz Co., Inc., Otto, 280 Lyell Ave., Rochester, N. Y.
Berryman Oil Burner Co., 1304 Washington Blvd., Chicago, Ill.
Bertsch & Co., Cambridge City, Ind.
Best Register Co., 2005 W. Oklahoma Ave., Milwaukee, Wis.
Bethlehem Foundry & Machine Co., W. Second St., Bethlehem, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Betz Unit Air Cooler Co., 6 W. Ninth St., Kansas City, Mo.
Beverly Throatless Shear Co., 3009 W. 110th Pl., Chicago, Ill.
Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee, Wis.
Bignall Co., 621-623 Main St., Medina, N. Y.
Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill.
Bird & Son, Inc., 163 Washington St., East Walpole, Mass.
Bishop & Babcock Sales Co., 4901 Hamilton Ave., Cleveland, O.
Bishop Humidifier Co., 8011 Dexter Blvd., Detroit, Mich.
Black & Decker Mfg. Co., Towson, Md.
Bliss Co., E. W., 1420 Hastings St., Toledo, O.
Bodine Electric Co., 2272 W. Ohio St., Chicago, Ill.
Bollaert, M., 3936 Rhoda Ave., Oakland, Cal.
Bossert Corp., 1800 Lenox Ave., Utica, N. Y.
Bousman Mfg. Co., Inc., 1157 Plainfield Ave., N. E., Grand Rapids, Mich.
Braden Engineering, Inc., 896 Elmwood Ave., Providence, R. I.
Braden Mfg. Co., 431 N. 14th St., Terre Haute, Ind.
Brasco Mfg. Co., Harvey, Ill.
●Brauer Supply Co., A. G., 316 N. Third St., St. Louis, Mo.
Breuer Electric Mfg. Co., 865 Blackhawk St., Chicago, Ill.
Bridesburg Foundry Co., Tacony & Duncan Sts., Philadelphia, Pa.
Bridgeport Brass Co., E. Main St., Bridgeport, Conn.
Bridgeport Chain & Mfg. Co., 964 Crescent Ave., Bridgeport, Conn.
Bridgeport Screw Co., Bridgeport, Conn.
Brigham Oil Burner Co., 2915 Clark Ave., St. Louis, Mo.
●Brillion Furnace Co., Brillion, Wis.
Bristol Co., Waterbury, Conn.
Brooklyn Metal Ceiling Co., 283-89 Greene Ave., Brooklyn, N. Y.
Bros Boiler & Mfg. Co., Wm., Nicollet Island, Minneapolis, Minn.
Brown-Brockmeyer Co., Inc., Overlook Ave., Dayton, O.
Brown Corp., 213 Bellevue Ave., Syracuse, N. Y.
Brown Instrument Co., Wayne & Roberts Aves., Philadelphia, Pa.
Brown Oil Burning Equipment Co., 312-314 Massachusetts Ave., Cambridge, Mass.
Brown Sheet Iron & Steel Co., 964 Berry Ave., St. Paul, Minn.
Brownell Co., N. Findlay St., Dayton, O.
Brundage Co., 246 W. Kalamazoo Ave., Kalamazoo, Mich.
Brunner Mfg. Co., 1821 Broad St., Utica, N. Y.
Bryan Plumbing & Heating Co., 213 W. Butler St., Bryan, O.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
Bryant Corp., C. L., 10511 Churchill Ave., Cleveland, O.
Bryant Heater Co., 17825 St. Clair Ave., Cleveland, O.
Buckeye Products Co., 7024 Vine St., Cincinnati, O.
Budke Stamping Co., P. O. Box 96, Canonsburg, Pa.
●Buffalo Forge Co., 497 Broadway, Buffalo, N. Y.
Buffalo Pumps, Inc., 171 Mortimer St., Buffalo, N. Y.
Burdett Mfg. Co., 19 N. Sheldon St., Chicago, Ill.
Burgess Battery Co., 111 W. Monroe St., Chicago, Ill.
Burgess Soldering Furnace Co., 292 E. Long St., Columbus, O.
Burke Electric Co., 1201 W. 12th St., Erie, Pa.
Burmester Gas Furnace Mfg. Co., 2117 Cuming St., Omaha, Nebr.
Burnham Boiler Corp., 1 Main St., Irvington, N. Y.
Burnley Battery & Mfg. Co., Clay St., North East, Pa.
Burnwell Corp., 125 N. Church St., Allentown, Pa.
Burt Air Filter Corp., Grand Central Terminal, New York City.
Burt Mfg. Co., 44 E. South St., Akron, O.
Bush Mfg. Co., 100 Wellington St., Hartford, Conn.
Butler Mfg. Co., 13th & Eastern, Kansas City, Mo.
Byers Co., A. M., Clark Bldg., Pittsburgh, Pa.

C

Cabot, Inc., Samuel, 141 Milk St., Boston, Mass.
Calbar Paint & Varnish Co., 2620 N. Martha St., Philadelphia, Pa.
California Cornice Works, Inc., 1620 N. Spring St., Los Angeles, Cal.
California Wire Cloth Co., 1001 22nd Ave., Oakland, Cal.
Calkins & Pearce, 203-205 E. Long St., Columbus, O.
Callahan Can Machine Co., Inc., 80 Richards St., Brooklyn, N. Y.
Caloroil Burner Corp., 1477 Park St., Hartford, Conn.
Campbell Heating Co., 31st and Dean, Des Moines, Ia.
●Campbell Heating Co., E. K., 2445 Charlotte St., Kansas City, Mo.
Cannon, Inc., James A., 1625 Cleveland Ave., Kansas City, Mo.
●Canton Steel Ceiling Mfg. Co., 2280 Winfield Way, S. E., Canton, O.
Canton Stoker Corp., 507 Andrews Pl., S. W., Canton, O.
Capital Mfg. Co., Kingsville, Tex.
●Capitol Furnace & Stove Repair, 227 S. Meridian St., Indianapolis, Ind.
Carbondale Machine Corp., Worthington Ave., Harrison, N. J.
Carbo-Oxygen Co., 221-223 Fourth Ave., Pittsburgh, Pa.
Carey Co., Philip, Wayne Ave., Lockland, Cincinnati, O.
Carnegie-Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R., Lima, O.
Carraway Engineering Co., Inc., 613 N. Pearl St., Dallas, Tex.
Carrier Engineering Corp., 850 Frelinghuysen Ave., Newark, N. J.
Carter Paint Co., Liberty, Ind.
Cary Mfg. Co., Waupaca, Wis.
Celotex Co., 919 N. Michigan Ave., Chicago, Ill.
Central Brass Mfg. Co., 2950 E. 55th, Cleveland, O.
●Central Furnace & Stove Repair Co., 3937 Olive St., St. Louis, Mo.
Central Steel & Wire Co., 4545 S. Western Blvd., Chicago, Ill.
Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.
Century Electric Co., 1806 Pine St., St. Louis, Mo.
Century Engineering Corp., 213-217 Fourth Ave., S. E., Cedar Rapids, Ia.
Century Fan & Engineering Co., 432 E. 165th St., New York City.
Certain-teed Products Corp., 100 E. 42nd St., New York City.
Chain Products Co., 3910 Cooper Ave., Cleveland, O.
Chalmers Oil Burner Co., 1234 Central Ave., Minneapolis, Minn.
Chamberlin Metal Weather Strip Co., 1254 La Brosse, Detroit, Mich.
Champion Blower & Forge Co., Lancaster, Pa.
Champion Furnace Pipe Co., 918 S. Adams St., Peoria, Ill.
Champion Spark Plug Co., Upton Ave., Toledo, O.
Champion Tool Co., 356 W. 91st St., Los Angeles, Cal.
●Chandler Co., 804 1st Ave., N. W., Cedar Rapids, Ia.
Chapman Clay Co., Zanesville, O.
Chapman Slate Co., 546 Main St., Bethlehem, Pa.
Chase Brass & Copper Co., 236 Grand St., Waterbury, Conn.
Cheney Co., 1200 Architects Bldg., 17th & Sansom Sts., Philadelphia, Pa.
●Chicago Metal Mfg. Co., 3720 S. Rockwell St., Chicago, Ill.
Chicago Perforating Co., 2445 W. 24th Pl., Chicago, Ill.
Chicago Pump Co., 2336 Wolfram St., Chicago, Ill.
Chicago Steel & Wire Co., 103rd St. & Torrence Ave., Chicago, Ill.
Chinook, Inc., 111 Endicott-Arcade Bldg., St. Paul, Minn.
Christensen Machine Co., 369 W. 8th South St., Salt Lake City, Utah.
●Christie Cleaner Co., 226-30 E. Front St., Cincinnati, O.
Cincinnati Mfg. Co., Gest & Evans Sts., Cincinnati, O.
Cincinnati Shaper Co., Hopple, Garrard & Elam, Cincinnati, O.
Cincinnati Sheet Metal & Roofing Co., 230 E. Front St., Cincinnati, O.
Cincinnati Stamping Co., 28-34 W. McMicken, Cincinnati, O.
●Clarage Fan Co., Kalamazoo, Mich.
Clark Bros. Bolt Co., Milldale, Conn.
Clark Controller Co., 1146 E. 152nd St., Cleveland, O.
Clark, Jr., Electric Co., Jas., 600 Bergman St., Louisville, Ky.
Clark Stek-O Corp., 1631 Dewey Ave., Rochester, N. Y.
Clarm Mechanical Devices Co., 410 S. Elizabeth St., Lima, O.
Clauss Shear Co., Fremont, O.
Clay Equipment Corp., Cedar Falls, Ia.
Clayton & Lambert Mfg. Co., 11111 French Rd., Detroit, Mich.
Cleveland Acid Swab Co., 1406 Marlowe Ave., Lakewood, O.
Cleveland Cooperative Stove Co., 2323 E. 67th St., Cleveland, O.
Cleveland Punch & Shear Works Co., E. 40th & St. Clair Ave., Cleveland, O.
Cleveland Steel Products Corp., 7306 Madison Ave., Cleveland, O.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clough, A. W., 28 S. Broad St., Meriden, Conn.
Cocking, Geo. J., 1336 W. 5th St., Santa Ana, Cal.
Cole Hot Blast Mfg. Co., 3108 W. 51st St., Chicago, Ill.
Coleman Lamp & Stove Co., 2nd & St. Francis, Wichita, Kan.
Columbia Burner Co.', 1649 Dorr St., Toledo, O.

Columbia Steel Co., Russ Bldg., 235 Montgomery St., San Francisco, Cal.
Columbian Enameling & Stamping Co., 1536 Beech St., Terre Haute, Ind.
Columbian Steel Tank Co., 1401-1625 W. 12th St., Kansas City, Mo.
Columbus Heating & Ventilating Co., 400 Dublin Ave., Columbus, O.
●Columbus Humidifier Co., 154 N. Fifth St., Columbus, O.
Columbus Metal Products, Inc., 767 N. 4th St., Columbus, O.
Combustion Engineering Co., Inc., 200 Madison Ave., New York City.
Combustioneer, Inc., Springfield, O.
Comfort Systems, Inc., 4411 Appleton St., Cincinnati, O.
Commodore Heaters Corp., 11 W. 42nd St., New York City.
Connors Paint Mfg. Co., Wm., 669-683 River St., Troy, N. Y.
Consolidated Air Conditioning Corp., 192 Lexington Ave., New York City.
Consolidated Ashcroft Hancock Co., Inc., 11 Elias St., Bridgeport, Conn.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Products Co., 1150 E. 222nd St., Euclid, O.
Continental Rubber Works, 1900 Liberty Parkway, Erie, Pa.
Continental Screw Co., Mt. Pleasant, New Bedford, Mass.
Continental Steel Corp., Kokomo, Ind.
Continental Stove Corp., Front & Walnut, Ironton, O.
Cook & Chick Co., 315 Union Park Ct., Chicago, Ill.
●Cook Electric Co., 2700 Southport Ave., Chicago, Ill.
Cooper Oven Thermometer Co., Pequabuck, Conn.
Copeland Refrigeration Corp., 1331 Holden Ave., Detroit, Mich.
Copperweld Steel Co., Glassport. Pa.
Coppus Engineering Corp., 344 Park Ave., Worcester, Mass.
Corbin Screw Corp., 300 High St., New Britain, Conn.
Cork Import Corp., 330 W. 42nd St., New York City.
Cork Insulation Co., Inc., 155 E. 44th St., New York City.
Cornell Iron Works, Inc., 36-20 13th St., Long Island City, N. Y.
Cornell Wood Products Co., 230 N. Michigan Ave., Chicago, Ill.
Corozone Air Conditioning Corp., 1422 Euclid Ave., 1110 Hanna Bldg., Cleveland, O.
Crane Co., 836 S. Michigan Ave., Chicago, Ill.
Crary Mfg. Co., Middleport, O.
Creo-Dipt Co., Inc., Oliver St., North Tonawanda, N. Y.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Cross Engineering Co., 160-178 Dundaff St., Carbondale, Pa.
Crown Fuel Saver Co., Richmond, Ind.
Crucible Steel Co. of America, 405 Lexington Ave., New York City.
Cupples Co., 401 S. 7th St., St. Louis, Mo.
Cutler-Hammer, Inc., N. 12th St. and W. St. Paul Ave., Milwaukee, Wis.

D

●Dail Steel Products Co., 1050 Main St., Lansing, Mich.
Daniels Mfg. Co., Inc., Sam, Daniels Rd., Hardwick, Vt.
Danville Stove & Mfg. Co., Danville, Pa.
Danzer Metal Works, Inc, 101 W. Lee St., Hagerstown, Md.
Davies Air Filter Corp., 390 4th Ave., New York City.
Day Co., The, 2938 Pillsbury Ave., Minneapolis, Minn.
Dayton Casting Co., Kiser & Chapel Sts., Dayton, O.
Dayton Greenhouse Mfg. Co., P. O. Box 801, Dayton, O.
Dayton Rubber Mfg. Co., 2345 W. Riverview Ave., Dayton, O.
De Bothezat Corp., 100 Sixth Ave., New York City.
Decatur Iron & Steel Co., Decatur, Ala.
Decatur Pump Co., 2750 Nelson Park Rd., Decatur, Ill.
De Laval Steam Turbine Co., 300 Nottingham Way, Trenton, N. J.
De La Vergne Engine Co. (Sales Agent for Baldwin-Southwark Corp.), Philadelphia, Pa.
D'Elia Oil Burner Co., Inc., 145 Stratford Ave., Bridgeport, Conn.
Delco Appliance Corp., 391 Lyell Ave., Rochester, N. Y.
Delco Products Corp., 329 E. First St., Dayton, O.
Delta Stoker Co., North Chicago, Ill.
Deming Co., Salem, O.
Deniston Co., 4856 S. Western Ave., Chicago, Ill.
Densmore-Quinlan Co., 910 74th St., Kenosha, Wis.
Deshler Foundry & Machine Works, 140-142 S. East Ave., Deshler, O.
●Detroit Lubricator Co., 5842 Trumbull Ave., Detroit, Mich.
Detroit Michigan Stove Co., 6900 E. Jefferson Ave., Detroit, Mich.
Detroit Safety Furnace Pipe Co., 5960 Second Blvd., Detroit, Mich.
Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit, Mich.
Detroit Stoker Co., General Motors Bldg., Detroit, Mich. (Sales & Engineering); Monroe, Mich. (Main Office & Works).
Detroit Torch & Mfg. Co., 12057 Cardoni Ave., Detroit, Mich.
Devlin Mfg. Co., Thos., Burlington, N. J.
Diamond Castings Co., Park Pl., DuBois, Pa.
Diamond Expansion Bolt Co., 500 North Ave., Garwood, N. J.
Diamond Mfg. Co., 243 W. 8th St., Wyoming, Pa.
Diamond Metal Weather Strip Co., 650 N. 4th St., Columbus, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dickson Weatherproof Nail Co., P. O. Box 334, Evanston, Ill.
Dieckmann Co., Ferdinand, 1182 Harrison St., Cincinnati, O.
Diehl Mfg. Co., Trumbull St., Elizabethport, N. J.
Diener Mfg. Co., Geo. W., 400 N. Monticello Ave., Chicago, Ill.
Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
Dongan Electric Mfg. Co., 2987 Franklin St., Detroit, Mich.
Dornback Furnace & Foundry Co., 724 E. 103rd St., Cleveland, O.
Double Duty Oil Burner Co., Inc., 319-325 18th St., Rock Island, Ill.
Dowagiac Steel Furnace Co., E. High St., Dowagiac, Mich.
Downs-Smith Brass & Copper Co., 43-15 38th St., Long Island City, N. Y.
●Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago, Ill.
Drouve Co., G., 2082 Kings Highway, Fairfield, Conn.
Drummond Sheet Metal Works, 121 W. First St., Wichita, Kan.
Duriron Co., Inc., 411 N. Findlay St., Dayton, O.
Duro Co., 537 E. Monument Ave., Dayton, O.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dusinberre Indicator Co., 101 Quentin St., Kew Gardens, N. Y.
Dutcher Heating Co., 1292 Washington St., Canton, Mass.

E

Eagle-Picher Lead Co., Temple Bar Bldg., Cincinnati, O.
●Eaglesfield Ventilator Co., 920 Dorman St., Indianapolis, Ind.
Easternoil, Inc., 133 Marginal Way, Portland, Me.
Eclipse Metal Mfg. Co., Main St., Eden, N. Y.
Econocol Stoker Co., Division of Cotta Transmission Corp., 2340 11th St., Rockford, Ill.
Economy Baler Co., Ann Arbor, Mich.
Economy Electric Mfg. Co., 4634 W. 21st Pl., Cicero, Ill.
Economy Pumping Machinery Co., Inc., 3431 W. 48th Pl., Chicago, Ill.
Eddy Stoker Corp., 4717 W. North Ave., Chicago, Ill.
Edison Electrical Controls Division, Thos. A. Edison, Inc., West Orange, N. J.
Edwards Furnace Co., 25 East Ave., Wellsboro, Pa.
Edwards Mfg. Co., Inc., 337 Eggleston Ave., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Eiermann Floor Scraper Co., 1971 Fulton St., Brooklyn, N. Y.
Eisler Electric Corp., 740 S. 13th St., Newark, N. J.
Electric Arc Cutting & Welding Co., 152 Jelliff Ave., Newark, N. J.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
Electric Furnace-Man, Inc., 7 Dey St., New York City.
Electric Materials Co., Clay & Washington Sts., North East, Pa.
Electric Soldering Iron Co., Inc., 342 W. 14th St., New York City.
●Electric Vacuum Cleaner Co., Inc., 1734 Ivanhoe Rd., Cleveland, O.
Electric Valve Mfg. Co., Inc., 68 Murray St., New York City.
Electroaire Corp., 1455 W. Congress St., Chicago, Ill.
Electrogas Furnace & Mfg. Co., 2575 Bayshore Blvd., San Francisco, Cal.
Electrol, Inc., 934 Main Ave., Clifton, N. J.
Elec-Tro-Matic Oil Burner Co., 487 Central Ave., Cedarhurst, L. I., N. Y.
Electro-Stoke Mfg. Co., 2002 Darwin St., Indianapolis, Ind.
Electrovent Corp., 5402 Western Ave., Detroit, Mich.
Electrovent Fan & Mfg. Co., 737 W. Washington Blvd., Chicago, Ill.
●Elgo Shutter & Mfg. Co., 634 W. Warren Ave., Detroit, Mich.
Ellison Draft Gage Co., 214 W. Kinzie St., Chicago, Ill.
Emerson Electric Mfg. Co., 500 N. 21st St., St. Louis, Mo.
Empire Door Co., Inc., 226 E. 144th St., New York City.
Empire Metal Co., 820 E. Water St., Syracuse, N. Y.
Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O.
Emrich Co., C., 127 W. Fulton St., Columbus, O.
Enterprise Boiler & Tank Works, Inc., 1955 N. Long Ave., Chicago, Ill.
Enterprise Foundry Co., E. "B" St., Belleville, Ill.
Enterprise Oil Burner Co., 2902 19th St., San Francisco, Cal.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Estate Stove Co., Hamilton, O.
Evans Corp., George, 121 37th St., Moline, Ill.
Everhot Mfg. Co., 619 S. 10th Ave., Maywood, Ill.
Evry-Use Products, Inc., 260 Canal St., New York City.
Excello Oil Heating Corp., 111½ S. 24th St., Omaha, Neb.
●Excelsior Steel Furnace Co., 118 S. Clinton St., Chicago, Ill.
Excelsior Stove & Mfg. Co., 504-630 S. Front St., Quincy, Ill.
Excelsior Tool and Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
Excelso Products Corp., 65 Clyde Ave., Buffalo, N. Y.

F

Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Fairmont Aluminum Co., Fairmont, W. Va.
Falco Furnace Co., 18 Valencia St., San Francisco, Cal.
Falstrom Co., Main Ave. & D. L. & W. R. R., Passaic, N. J.
Fanner Mfg. Co., Brookside Park, Cleveland, O.
Farquhar Furnace Co., 150 Owens Ave., Wilmington, O.
Farris Furnace Co., 920-930 Enos Ave., Springfield, Ill.
Faultless Castings Co., Central Bank Bldg., Greencastle, Ind.
Faultless Heater Corp., 1220 Main Ave. N. W., Cleveland, O.
Favorite Mfg. Co., Piqua, O.
Fedders Mfg. Co., 57 Tonawanda St., Buffalo, N. Y.
Federal Machine & Welder Co., Dana Ave., Warren, O.
Fee and Stemwedel, Inc., 219 W. Chicago Ave., Chicago, Ill.

Ferguson Regulator Co., 288 Alameda Ave., Youngstown, O.
Field Mfg. Co., 2328 Nelson St., Chicago, Ill.
Figge Co., 1617 N. Hoyne Ave., Chicago, Ill.
Fingles, Inc., W. A., Reistertown Road at Elgin Ave., Baltimore, Md.
Finnell Rotary Stokers, Inc., 502 East St., Elkhart, Ind.
●**Fireline Stove & Furnace Lining Co., 1166 Clay St., Chicago, Ill.**
Fisele Mop Mfg. Co., Thos. J., 742 S. 4th St., St. Louis, Mo.
Fisher Governor Co., Marshalltown, Ia.
FitzGibbon & Crisp, Inc., 467 Calhoun St., Trenton, N. J.
Flemm Lead Co., Inc., Bradley Ave., Long Island City, N. Y.
Flintkote Co., 50 W. 50th St., New York City.
Floral City Co., 402 S. Monroe St., Monroe, Mich.
Floyd-Wells Co., Royersford, Pa.
Flynn & Emrich Co., 301 Holliday St., Baltimore, Md.
Follansbee Brothers Co., 3rd & Liberty Aves., Pittsburgh, Pa.
Folsom Snow Guard Co., 80 Boylston St., Boston, Mass.
Foote Foundry Co., J. B., N. Main St., Fredericktown, O.
●**Forct-Air Co., 840 Cedar St., Rockford, Ill.**
●**Forest City Foundries Co., 2500 W. 27th St., Cleveland, O.**
Forest Specialty Co., 651 W. Randolph St., Chicago, Ill.
Foss Heating & Engineering Co., 12 S. Chester Ave., Pasadena, Cal.
Fox Engineering Co., 36 Portland St., Boston, Mass.
●**Fox Furnace Co., Elyria, O.**
Foxboro Co., Neponset Ave., Foxboro, Mass.
Franklin Gas Appliance Co., 221-223 E. Eighth St., Cincinnati, O.
Fraser Furnace Co., Inc., Stockton, Cal.
Frederick Iron & Steel Co., E. 7th & East Sts., Frederick, Md.
Free-Man Stoker & Engineering Co., 105 E. 63rd St., Chicago, Ill.
French Rotary Oil Burner Co., P. O. Box N, Sebastopol, Cal.
Frick Co., Inc., Waynesboro, Pa.
Friedley-Voshardt Co., 761 Mather St., Chicago, Ill.
●**Friez & Sons, Inc., Julien P., 4 N. Central Ave., Baltimore, Md.**
Frigidaire Corp., Dayton, O.
Fuel Savers, Inc., 15th & Herr Sts., Harrisburg, Pa.
Fuller-Warren Co., 2506 N. 32nd St., Milwaukee, Wis.
Fulton-Sylphon Co., Knoxville, Tenn.
●**Furblo Co., Hermansville, Mich.**
Furnaceslave, Inc., 1080 E. 52nd St., Indianapolis, Ind.

G

G & O Mfg. Co., 138 Winchester Ave., New Haven, Conn.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., New York City.
Galva Heater Co., Galva, Ill.
Gammeter Co., W. F., Lincoln Ave. Extension, Cadiz, O.
Garber Lumber & Construction Co., Strasburg, O.
Garden City Fan Co., 332 S. Michigan Blvd., Chicago, Ill.
Gardiner Metal Co., 4820 S. Campbell Ave., Chicago, Ill.
Gasweld & Airway, Inc., 625 W. Jackson Blvd., Chicago, Ill.
Gates Rubber Co., 999 S. Broadway, Denver, Colo.
Gehl Bros. Mfg. Co., West Bend, Wis.
Gehri Co., 1117 Tacoma Ave., Tacoma, Wash.
Gem City Stove Co., 508 Linden Ave., Dayton, O.
General Blower Co., 2402 Market St., Philadelphia, Pa.
General Controls Co., 1370 Harrison St., San Francisco, Cal.; Broadway & E. 15th St., Cleveland, O.
●**General Electric Co., 1 River Rd., Schenectady, N. Y.**
General Equipment Co., 311-15-19 S. Wichita St., Wichita, Kan.
General Insulating & Mfg. Co., 125 Fairview Ave., Alexandria, Ind.
General Oil Heating Corp., 528 Jefferson St., West New York, N. J.
General Refrigeration Sales Co., Beloit, Wis.
●**General Regulator Corp., 2608 Arthington St., Chicago, Ill.**
General Sheet Metal Works, Inc., 120 Silliman Ave., Bridgeport, Conn.
Gerhardt, W. F., 2943 W. Marshall St., Richmond, Va.
Germer Stove Co., Erie, Pa.
Geuder, Paeschke & Frey Co., W. St. Paul Ave. and N. 15th St., Milwaukee, Wis.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Gilmer Co., L. H., Cottman & Keystone Sts., Tacony, Philadelphia, Pa.
Glascock Bros. Mfg. Co., Muncie, Ind.
Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y.
Glidden Co., 11001 Madison Ave., Cleveland. O.
Globe Iron Roofing & Corrugating Co., P. O. Box 734, Cincinnati, O.
Globe Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
Globe Machinery & Supply Co., 205-211 W. Court Ave., Des Moines, Ia.
Globe Ventilator Co., 205 River St., Troy, N. Y.
Goethel Co., Alfred C., 2337 N. 31st St., Milwaukee, Wis.
Goethel Sheet Metal Works, Alfred, 1912 N. Killian Pl., Milwaukee, Wis.
Goldens' Foundry & Machine Co., Columbus, Ga.
Gold Seal Furnace Co., 234 S. Fourth St., Minneapolis, Minn.
Gold Star Oil Burner Mfg. Co., Inc., 146 Warburton Ave., Yonkers, N. Y.
Goodrich Co., B. F., 516 S. Main St., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Goshen Churn & Ladder Co., E. Lincoln Ave., Goshen, Ind.
Goshen Mfg. Co., 900 Reynolds St., Goshen, Ind.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Graff Furnace Co., Scranton, Pa. (See Faultless Heater Corp., Cleveland, O.)
Grand Rapids Blow Pipe and Dust Arrester Co., 525 Monroe Ave., Grand Rapids, Mich.
Grand Rapids Die & Tool Co., 113-117 Michigan St., Grand Rapids, Mich.
●Grand Rapids Furnace Cleaner Co., 1148 S. Division Ave., Grand Rapids, Mich.
Grand Rapids Wire Products Co., 503 Front Ave., N. W., Grand Rapids, Mich.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
Graton & Knight Co., 356 Franklin St., Worcester, Mass.
Gray Metal Products, Inc., 20 Beacon St., Rochester, N. Y.
Green Foundry & Furnace Works, Third & Elm Sts., Des Moines, Ia.
Greene Gas Cleaner Co., 1600 Union Trust Bldg., Cleveland, O.
Grinnell Co., Inc., 260 W. Exchange St., Providence, R. I.
Grinnell Washing Machine Corp., 723-35 Main St., Grinnell, Ia.
Griswold Mfg. Co., 1001-1065 W. 12th St., Erie, Pa.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.

H

Hague & Co., Inc., Alfred, 233 37th St., Brooklyn, N. Y.
Hall Metal Products Co., 1285 Wilmington Blvd., Long Beach, Cal.
Hall-Neal Furnace Co., 1324 N. Capitol Ave., Indianapolis, Ind.
Hamilton Automatic Stoker Corp., 1637 Dixie Highway, Hamilton, O.
Hammett Mfg. Co., 1907 Holmes St. ,Kansas City, Mo.
Handelan Washed Air Co., 502 E. 24th St., Minneapolis, Minn.
Handy & Harmon, 82 Fulton St., New York City.
Hardinge Bros., Inc., 1770 Berteau St. at Ravenswood, Chicago, Ill.
Hardy Mfg. Co., 100 Davis Ave., Dayton, O.
Hare Stoker Corp., 4853 Rivard St., Detroit, Mich.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis.
Harold Furnace Mfg. Co., E., 3310 Sprague Ave., Spokane, Wash.
●Harrington & King Perforating Co., 5649 Fillmore St., Chicago, Ill.
Harris Calorific Co., 5501 Cass Ave., N. W., Cleveland, O.
●Hart & Cooley Mfg. Co., 61 W. Kinzie St., Chicago, Ill.
Hart & Crouse Co., Inc., 301 Turner St., Utica, N. Y.
Hart Mfg. Co., Bartholemew & Hamilton Sts., Hartford, Conn.
Hart Mfg. Co., 2006 N. Western Parkway, Louisville, Ky.
Hart Oil Burner Corp., 2200 N. Adams St., Peoria, Ill.
Hartzell Propeller Fan Co., 1025 Roosevelt Ave., Piqua, O.
Harvey-Whipple, Inc., 55 Emery St., Springfield, Mass.
Hassall, Inc., John, Clay & Oakland Sts., Brooklyn, N. Y.
Hauck Mfg. Co., 126 Tenth St., Brooklyn, N. Y.
Hayes Custer Stove Co., 1202 N. Linden St., Bloomington, Ill.
Haynes Furnace Fan Co., 614 Prospect St., Kansas City, Mo.
●Hays Corp., E. Eighth St., Michigan City, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
Health Air Systems, Inc., 2941 E. Jefferson Ave., Detroit, Mich.
Health-O-Mist Humidifier Mfg. Co., James St., Columbus, Wis.
Healy-Ruff Co., 765 Hampden Ave., St. Paul, Minn.
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.
Heat Control Corp., 3231 N. 30th St., Milwaukee, Wis.
Heath & Milligan Mfg. Co., 1833 Seward St., Chicago, Ill.
Heating Assurance, Inc., 121-123 N. Browne, Spokane, Wash.
Heetrozone Corp., 603 Thorpe Bldg., Minneapolis, Minn.
Heil Co., 3000 W. Montana St., Milwaukee, Wis.
Hendley & Whittemore Co., 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., Carbondale, Pa.
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn.
●Henry Furnace & Foundry Co., 3473 E. 49th St., Cleveland, O.
Her-Born Eng. & Mfg. Co., Box 666, Sandusky, O.
Herrmann & Grace Co., 671 Bergen St., Brooklyn, N. Y.
Hershey-Motorstoker Corp., 347 Madison Ave., New York City.
●Hess-Snyder Co., Massillon, O.
●Hess Warming & Ventilating Co., 1211 S. Western Ave., Chicago, Ill.
Hetzel Roofing Products Co., 67 Main St., Newark, N. J.
Hill Co., E. Vernon, 121 N. Clark St., Chicago, Ill.
Hipoint Corp., Water, Elm & Arnold Sts., Bellefontaine, O.
Hirschman Co., Inc., W. F., 220 Delaware Ave., Buffalo, N. Y.
Hobart Brothers Co., Troy, O.
Hoersting & Holtmann Co., 1133 W. 3rd St., Dayton, O.
Holcomb & Hoke Mfg. Co., 1545 Van Buren St., Indianapolis, Ind.
Holland Furnace Co., Columbia Ave., Holland, Mich.
Hollup Corp., 3333 W. 48th Pl., Chicago, Ill.
Holtum Mfg. Co., Freeport, Ill.
Holtzer-Cabot Electric Co., 125 Amory St., Boston, Mass.
●"Home Comfort" Furnace & Mfg. Co., 2901-11 Elliot Ave., St. Louis, Mo.
Home Furnace Co., 6th St. & P. M. R.R., Holland, Mich.
Home Oil Burner Corp., 236 Main St., Hempstead, N. Y.
Home Stove Co., 501 Kentucky Ave., Indianapolis, Ind.
Hones, Inc., Charles A., 122 S. Grand Ave., Baldwin, N. Y.
Hood Co., B. Mifflin, Daisy, Tenn.
Horn Co., A. C., 43-36 Tenth St., Long Island City, N. Y.
Hotentot Co., Inc., 1708 Howard St., Omaha, Nebr.
Hotstream Heater Co., 8007 Grand Ave., Cleveland, O.
Houghton & Co., E. F., 240 W. Somerset St., Philadelphia, Pa.

Howell Electric Motors Co., Howell, Mich.
Howes Co., S. M., 511 Medford St., Charlestown District, Boston, Mass.
Hubbard Co., 1014 Marquette Ave., Minneapolis, Minn.
Hudson Equipment Corp., 324 Third Ave., N., Minneapolis, Minn.
Huffman Mfg. Co., Davis & Gilbert Aves., Dayton, O.
Hugo Mfg. Co., 49th Ave. W. & Superior St., Duluth, Minn.
Humidi-Cooler Corp., New Haven, Conn.
Humidity Headquarters, 1893 E. 55th St., Cleveland, O.
Hum-O-Zone Co., Horicon, Wis.
Hupp Oil Burner Co., Inc., 251 Prospect Ave., Brooklyn, N. Y.
●Hussey & Co., C. G., 2850 Second Ave., Pittsburgh, Pa.

I

Ideal Commutator Dresser Co., Sycamore, Ill.
Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
Ideal Furnace Co., 2995 E. Grand Blvd., Detroit, Mich.
Ideal Metal Weather Strip Co., 1015 Walnut, Box 461, Boulder, Colo.
Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago, Ill.
Illinois Iron & Bolt Co., 918 S. Michigan Ave., Chicago, Ill.
Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago, Ill.
Illinois Zinc Co., Peru, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
Imperial Electric Co., Ira Ave., Akron, O.
Independence Stove & Furnace Co., Cor. Hayward & Cottage, Independence, Mo.
Independent Air Filter Co., 215 W. Ohio St., Chicago, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
●Independent Register & Mfg. Co., 3741 E. 93rd St., Cleveland, O.
Ingersoll-Rand, 11 Broadway, New York City.
Ingersoll Steel & Disc Co., Division of Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill.
Ingle Mfg. Co., Atlantic & Grape Sts., San Diego, Cal.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Insulite Co., 1100 Builders Exchange Bldg., Minneapolis, Minn.
International Draft Control Co., Rm. 502, 6611 Euclid Ave., Cleveland, O.
●International Engineering, Inc., 1145 Bolander, Dayton, O.
International Heater Co., 101 Park Ave., Utica, N. Y.
●International Nickel Co., Inc., 67 Wall St., New York City.
International Steel Co., Evansville, Ind.
●Interstate Machinery Co., Inc., 130 S. Clinton St., Chicago, Ill.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia, Pa.
Iowa Foundry Co., W. 2nd & Cook, Sioux City, Ia.
Iowa Paint Mfg. Co., 118-20 Eighth St., Des Moines, Ia.
Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland, O.
Iwan Brothers, 1503 Prairie Ave., South Bend, Ind.

J

Jackson-Bangor Slate Co., Pen Argyl, Pa.
Jackson Sheet Metal Works, 3012 Washington Ave., Ogden, Utah.
Jacobson Machine Works, Inc., A. E., 1090 Tenth Ave. S. E., Minneapolis, Minn.
Jaden Mfg. Co., Inc., F., 1601 2nd St., Hastings, Nebr.
Jamar Co., Walker, 367 S. First Ave., E., Duluth, Minn.
Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
Jelliff Mfg. Corp., C. O., Southport, Conn.
Jewett Stove & Foundry Corp., Military Rd., Buffalo, N. Y.
Johns-Manville, 22 E. 40th St., New York City.
Johnson Co., S. T., 940 Arlington St., Oakland, Cal.
Johnson Fan & Blower Corp., 1319 W. Lake St., Chicago, Ill.
Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson, Inc., William, Brenner & Kent Sts., Newark, N. J.
Johnson Mfg. Co., Tenth & Sycamore, Waterloo, Ia.
Johnson Mfg. Co., Urbana, O.
Johnson Metal Products Co., Erie, Pa.
Johnson Service Co., 507 E. Michigan St., Milwaukee, Wis.
Johnson Tool Co., Inc., 65 Massasoit Ave., East Providence, R. I.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago, Ill.
Johnston & Jennings Co., 877 Addison Rd., Cleveland, O.
Johnston Co., Wm. W., 115 Bayard St., Dayton, O.
Johnston Gas Furnace Corp., 5367 W. Washington St., Los Angeles, Cal.
Johnston Mfg. Co., 2825 E. Hennepin Ave., Minneapolis, Minn.
Johnston Tin Foil & Metal Co., 6106 S. Broadway, St. Louis, Mo.
●Joliet Heating Corp., Joliet, Ill.
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh, Pa.
Jones Foundry & Machine Co., W. A., 4401 W. Roosevelt Rd., Chicago, Ill.
●Jordan & Co., Paul R., 630 S. Delaware St., Indianapolis, Ind.

K

Kais Sunrise Works, 5659 Linwood Ave., Detroit, Mich.
Kaiser Co., H. S., 936 W. Chicago Ave., Chicago, Ill.
Kalamazoo Stove Co., Kalamazoo, Mich.
Kansas City Furnace Co., 624 Prospect, Kansas City, Mo.
Kauffman Air Conditioning Corp., 4485 Olive St., St. Louis, Mo.
Kaybar Burner Corp., 4545 Cottage Grove Ave., Chicago, Ill.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keith Furnace Co., Dean Ave. at E. 26th, Des Moines, Ia.
Kelsey Heating Co., 277 James St., Syracuse, N. Y.
Kelvinator Corp., 14250 Plymouth Ave., Detroit, Mich.
Kent Co., Inc., 103 Canal St., Rome, N. Y.
Kernchen Co., 103 E. Wacker Dr., Chicago, Ill.
Kester Solder Co., 4201 Wrightwood Ave., Chicago, Ill.
Ke-Ti Products Co., 1757 Franklin Ave., Columbus, O.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
King Ventilating Co., Owatonna, Minn.
Kinnear Mfg. Co., P. O. Box 1407, Columbus, O.
Kirk & Blum Mfg. Co., 2850 Spring Grove Ave., Cincinnati, O.
Kitson Co., Westmoreland & Stokley Sts., Philadelphia, Pa.
Klauer Mfg. Co., 9th & Washington Sts., Dubuque, Ia.
Kleenaire Corp., Stevens Point, Wis.
Kleen-Heet, Inc., 1823 Carroll Ave., Chicago, Ill.
Klein Stove Co., Trenton Ave. & Tioga St., Philadelphia, Pa.
Knowles Mushroom Ventilator Co., 41 N. Moore St., New York City.
Koons Furnace Co., 219 W. Van Buren, Danville, Ill.
Koppers Products Co., Koppers Bldg., Pittsburgh, Pa.
Korfund Co., Inc., 48-15 32nd Pl., Long Island City, N. Y.
Kraissl Co., Inc., 620 Main St., Hackensack, N. J.
Kraker, Henry, 54 W. 14th St., Holland, Mich.
Kruse Co., Inc., 353 W. 16th Pl., Indianapolis, Ind.
Kruse & Dewenter Co., 427-429 E. Washington St., Indianapoplis, Ind.

L

Laclede-Christy Clay Products Co., 411 N. Seventh St., St. Louis, Mo.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Laco Oil Burner Co., 238 Union St., Griswold, Ia.
La Crosse Steel Roofing & Corrugating Co., 300 S. Third St., La Crosse, Wis.
Lamb & Ritchie Co., 250 Albany St., Cambridge, Mass.
●Lamneck Products, Inc., 414-436 Dublin Ave., Columbus, O.
Lastik Products Co., Inc., 807 American Bank Bldg., Pittsburgh, Pa.
●Lau Heating Service, Inc., 954-72 E. Monument Ave., Dayton, O.
Leach Co., 412 S. Main St., Oshkosh, Wis.
Leahy Mfg. Co., 1804 E. 8th St., Los Angeles, Cal.
Lecourtenay Co., 5 Main St., Newark, N. J.
Ledkote Products Co., 128 Spring St., Everett, Mass.
Lee & Son Co., K. O., Aberdeen, S. D.
Lee & Son Co., Thomas, 128-132 W. Second St., Cincinnati, O.
Lee Heating Systems, Federal & Reserve St., Youngstown, O.
Leeds & Northrup Co., 4953 Stenton Ave., Philadelphia. Pa.
Leeson Co., T. F., 14631 Meyers Rd., Detroit, Mich.
Leland Electric Co., 1501 Webster St., Dayton, O.
●Lennox Furnace Co., Marshalltown, Ia. and Syracuse, N. Y.
Levow, David, 308 W. 20th St., New York City.
Lewis Air Conditioners, Inc., 1600 Broadway, N. E., Minneapolis, Minn.
Lewis & Co., Chas. S., 2207 Pine St., St. Louis, Mo.
Liberty Coal Burner Co., 4363 Duncan St., St. Louis, Mo.
●Liberty Foundry Co., 7600 Vulcan St., St. Louis, Mo.
Lincoln Electric Co., 12818 Coit Rd., Cleveland, O.
Linde Air Products Co., 30 E. 42nd St., New York City.
Link Belt Co., Stoker Div., 2410 W. 18th St., Chicago, Ill.
Liquefied Gas Appliance Co., Mars, Pa.
Liquidometer Corp., 36-16 Skillman Ave., Long Island City, N. Y.
Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
Little Burner Co., Inc., H. C., 2nd & Lincoln, San Rafael, Cal.
Littleford Bros., 457 E. Pearl St., Cincinnati, O.
Lochinvar Corp., 11921 Grand River Ave., Detroit, Mich.
Logan-Long Co., 37 W. Van Buren St., Chicago, Ill.
Long Controls Co., Inc., Thomas, 747 N. Scott St., South Bend, Ind.
Lookout Furnace Co., Manufacturer's Rd. & Compress St., Chattanooga, Tenn.
Lord Mfg. Co., 1316 Holland St., Erie, Pa.
Ludlow-Saylor Wire Co., Newstead Ave. & Wabash R. R., St. Louis, Mo.
Ludlum Steel Co., Watervliet, N. Y.
Ludowici-Celadon Co., 104 S. Michigan Ave., Chicago, Ill.
Lukens Metal Co., Thos. F., 1105 Fairmount Ave., Philadelphia, Pa.
Lukens Steel Co., S. First Ave., Coatesville, Pa.
Lyman Co., H. B., Southampton, Mass.
Lynn Products Co., 7 Willow St., Lynn, Mass.
Lyon, Conklin & Co., Inc., Race & McComas Sts., Baltimore, Md.

M

McClave-Brooks Co., W. Poplar St., Scranton, Pa.
McClure Builders' Supply Co., East Palestine, O.
McCord Radiator & Mfg. Co., 2587 E. Grand Blvd., Detroit, Mich.
McCorkle Co., D. H., Sixth & Bancroft Way, Berkeley, Cal.

McCormick & Co., J. H., Foot Susquehanna St., Williamsport, Pa.
McDonnell & Miller, 400 N. Michigan Ave., Chicago, Ill.
McGee-Parry Machine Works, 465 W. 8th S., Salt Lake City, Utah.
McIlvaine Burner Corp., 663 W. Washington Blvd., Chicago, Ill.
McKinney Tool & Mfg. Co., 1688 Arabella Rd., Cleveland, O.
McPherson Furnace & Supply Co., 1805 N. E., 2nd Ave., Portland, Ore.
MaGirl Foundry & Furnace Works, P. H., 401-413 E. Oakland Ave., Bloomington, Ill.
Mahan Oil Burner & Furnace Co., Lake & Church, Elmhurst, Ill.
Mahoning Valley Steel Co., McKees Lane, Niles, O.
Mahr Mfg. Co., 1728 N. 2nd St., Minneapolis, Minn.
●Maid-O'-Mist, Inc., 45 E. Ohio St., Chicago, Ill.
Majestic Co., 733 Erie St., Huntington, Ind.
Majestic Furnace Co., 1723 Westlake Ave., N., Seattle, Wash.
Malleable Iron Fittings Co., Branford, Conn.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City, N. Y.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
Maple City Furnace Co., 605 S. Main St., Monmouth, Ill.
Maple Valley Mfg. Co., First St., Mapleton, Ia.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., and 561 W. Washington Blvd., Chicago, Ill.
Marcus Smoke Stack Water Heaters, 40 Paterson Plank Rd., Union City, N. J.
Marion Machine, Foundry & Supply Co., P. O. Box 685, Marion, Ind.
●Marley Co., 1915 Walnut St., Kansas City, Mo.
Marsh Lumber Co., 535-611 Tuscarawas Ave., N. W., Dover, O.
Marshall Furnace Co., Marshall, Mich.
Marshalltown Mfg. Co., 901 E. Nevada St., Marshalltown, Ia.
Martin Bros., 52 Mt. Hope Ave., Rochester, N. Y.
Martin Metal Mfg. Co., 900 E. 2nd St., Wichita, Kan.
Martin-Parry Corp., W. Market St., York, Pa.
Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia, Pa.
Masonite Corp., 111 W. Washington St., Chicago, Ill.
Master Electric Co., 100 Davis Ave., Dayton, O.
Master Welders, 2524 Holmes St., Kansas City, Mo.
Matthiessen & Hegeler Zinc Co., Ninth St., LaSalle, Ill.
●Maurey Mfg. Corp., Wabash at 29th, Chicago, Ill.
May-Fiebeger Co., S. 21st St., Newark, O.
Mayflower Oil Burner Corp., 5002 Hudson Blvd., West New York, N. J.
May Oil Burner Corp., Maryland Ave. & Oliver St., Baltimore, Md.
Maze Co., W. H., 1207 Water St., Peru, Ill.
Mechanical Air, 801 Thomas St., Little Rock, Ark.
Medart Co., 3500 DeKalb St., St. Louis, Mo.
Meier Electric & Machine Co., 3525 E. Washington St., Indianapolis, Ind.
Melbye Bros, Inc., 3204 N. Oakley Ave., Chicago, Ill.
Mellish & Murray Co., 1715 Carroll Ave., Chicago, Ill.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia, Pa.
●Mercoid Corp., 4209 Belmont Ave., Chicago, Ill.
Merion Sporting Goods Mfg. Corp., 127 S. Fifth St., Philadelphia, Pa.
Merrill Co., Inc., 98 Granite St., Boston, Mass.
Mesker & Co., Geo. L., 400 N. W. First St., Evansville, Ind.
Metal Door & Trim Co., La Porte, Ind.
Metal Products Co., 1811 Linn St., Cincinnati, O.
Metalace Corp., 60 K St., South Boston, Mass.
Metropolitan Refining Co., 23 50th Ave., Long Island City, N. Y.
●Metzner Stove Repair Co., 515 Wyandotte, Kansas City, Mo.
●Meyer & Bro. Co., F., 1311-13 S. Adams St., Peoria, Ill.
●Meyer Furnace Co., 1300 S. Washington St., Peoria, Ill.
Meyers Fuel Saver Co., Inc., Janesville, Wis.
Miami Foundry Co., Miamisburg, O.
Michigan Wire Cloth Co., 2157 Howard St., Detroit, Mich.
Micro Corp., Bettendorf, Ia.
Midwest Aluminum Products, Inc., 123 E. Pittsburgh Ave., Milwaukee, Wis.
Midwest Ventilating Works, 123 E. Pittsburgh Ave., Milwaukee, Wis.
Milburn Co., Alexander, 1424 W. Baltimore St., Baltimore, Md.
●Milcor Steel Co., 4117 W. Burnham St., Milwaukee, Wis.
Mill Products Co., 25 Railroad, Elberton, Ga.
Miller & Doing, Inc., 60 York St., Brooklyn, N. Y.
Miller Conditionair, Inc., 1138 S. Broadway, Los Angeles, Cal.
Miller Electric Mfg. Co., 1134 W. Wisconsin Ave., Appleton, Wis.
Miller Equipment Co., 120 Opera Pl., Cincinnati, O.
Miller Floor Furnace Co., 741 E. 14th St., Oakland, Cal.
Miller Range & Furnace Co., Wm., 810-812 Main St., Cincinnati, O.
Miller Rubber Products Co., Inc., Akron, O.
Mill-Rose Co., 2498 E. 79th St., Cleveland, O.
Milwaukee Brush Mfg. Co., 2236 N. 30th St., Milwaukee, Wis.
Milwaukee Welded Steel Corp., 3842 W. Burnham St., Milwaukee, Wis.
Mineral Felt Co., 2284-92 Albion St., Toledo, O.
Mineral Insulation Co., 103rd & S. West Highway, Chicago Ridge, Ill.
Minneapolis Automatic Draft Regulator Co., 506 Produce Exchange Bldg., Minneapolis, Minn.
●Minneapolis-Honeywell Regulator Co., 2726 Fourth Ave., S., Minneapolis, Minn.
Minn-Kota Foundry & Mfg. Co., 201 Second St., N., Fargo, N. D.
Minster Machine Co., Minster, O.
Mitchell, A., Merchandise Mart, Chicago, Ill.
Model Mfg. Co., 316 E. Main St., Richmond, Va.
Modern Heat Regulator Co., E. 55th St. at Utica Ave., Cleveland, O.
Modine Mfg. Co., 17th St., Racine, Wis.
Moeller Instrument Co., 265 Sumpter St., Brooklyn, N. Y.
Mohawk Asphalt Heater Co., E. Main St., Frankfort, N. Y.
Mohler Co., J. K., 151 Church Ave., Ephrata, Pa.
Moloch Foundry & Machine Co., Kaukauna, Wis.
Monarch Mfg. Works, Inc., Salmon & Westmoreland Sts., Philadelphia, Pa.
Monarch Metal Weatherstrip Corp., 6333 Etzel Ave., St. Louis, Mo.
Moncrief Furnace Co., P. O. Box 1673, Atlanta, Ga.
Monitor Controller Co., 51 S. Gay St., Baltimore, Md.
●Monmouth Products Co., 231 E. 131st St., Cleveland, O.
Montag Stove & Furnace Works, 2011 N. Columbia Blvd., Portland, Ore.
Moore Corp, Joliet, Ill.
Morey & Jones, Ltd., 922 S. Hemlock St., Los Angeles, Cal.
Morris Machine Works, Baldwinsville, N. Y.
Morrissey & Co., 325 W. Huron St., Chicago, Ill.
Morrison Bros. Co., 24th & Elm Sts., Dubuque, Ia.
Motor Wheel Corp., Heater Division, E. May St., Lansing, Mich.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee, Wis.
Muncie Gear Works, Inc., N. Vine St., Muncie, Ind.
Mundet Cork Corp., 450 7th Ave., New York City.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City, N. J.
Murray Tile Co., Cloverport, Ky.
Myco Mfg. Co., 1120 Buhl Bldg., Detroit, Mich.
Myers Electric Co., 424 Fourth Ave., Pittsburgh, Pa.

N

Nash Engineering Co., South Norwalk, Conn.
Nash Refrigeration Co., Inc., Summit, New & Bleecker Sts., Newark, N. J.
National Airoil Burner Co., 1327 Girard Ave., Philadelphia, Pa.
National Asbestos Mfg. Co., 163 Henderson St., Jersey City, N. J.
National Brass & Copper Co., Inc., 518 Grant Bldg., Pittsburgh, Pa.
National Electric Welding Machines Co., 1846-60 N. Trumbull St., Bay City, Mich.
National Fan & Blower Corp., 543 W. Washington Blvd., Chicago, Ill.
National Fireproofing Corp., Fulton Bldg., Pittsburgh, Pa.
●National Foundry & Furnace Co., Station "B," Dayton, O.
National Lead Co., 111 Broadway, New York City.
National Machine Tool Co., 1536 Clark St., Racine, Wis.
National Mfg. Corp., 153 Fillmore Ave., Tonawanda, N. Y.
National Regulator Co., 2301 N. Knox Ave., Chicago, Ill.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland, O.
National Sheet Metal Co., 1617-1629 Water St., Peru, Ill.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Steel Corp., Grant Bldg., Pittsburgh, Pa.
National Super Service Co., 1944 N. 13th St., Toledo, O.
Neemes Foundry, Inc., 286 First St., Troy, N. Y.
Nelson Co., 2604 4th Ave., Detroit, Mich.
Nelson Corp., Herman, 1824 Third Ave., Moline, Ill.
Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia, Pa.
New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.
Newark Wire Cloth Co., 351 Verona Ave., Newark, N. J.
New Delphos Mfg. Co., Delphos, O.
New Departure Mfg. Co., Bristol, Conn.
New Haven Copper Co., Seymour, Conn.
New Jersey Zinc Sales Co., 160 Front St., New York City.
Newman Brothers, Inc., 662-670 W. Fourth St., Cincinnati, O.
●Newport Rolling Mill Co., 9th & Lowell Sts., Newport, Ky.
New York Blower Co., 3155 Shields Ave., Chicago, Ill.
Niagara Blower Co., 6 E. 45th St., New York City.
●Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y.
Niles Rolling Mill Co., Niles, O.
Norge Commercial Div., Borg-Warner Corp., 670 E. Woodbridge St., Detroit, Mich.
Norge Heating & Conditioning Div., Borg-Warner Corp., 670 E. Woodbridge St., Detroit, Mich.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Norman Sheet Metal Mfg. Co., W. F., 212-236 N. Cedar St., Nevada, Mo.
Norristown Magnesia & Asbestos Co., Washington St., Below Ford St., Norristown, Pa.
North Bangor Slate Co., Bangor, Pa.
Northern Weatherstrip Co., 367 S. 1st Ave. E., Duluth, Minn.
●Northwestern Stove Repair Co., 662 W. Roosevelt Rd., Chicago, Ill.
Nortmann-Duffke Co., 2740 S. 32nd St., Milwaukee, Wis.
Novy Ventilator Mfg. Co., 207 E. Broadway, Muskogee, Okla.
Nugent Sons, Inc., Thos., 223 E. 80th St., New York City.
●Nu-Way Corp., Rock Island, Ill.

O

●Oakland Foundry Co., Belleville, Ill.
●Ohio Electric Mfg. Co., 5910 Maurice Ave., Cleveland, O.
Ohio Products Co., 17606 Milburn Ave., Cleveland, O.
Ohio Valley Pulley Works, Maysville, Ky.
Ohio Wire Products Co., Public Square, Dover, O.
Ohl & Co., Geo. A., 151-161 Oraton St., Newark, N. J.
Ohmiac Paint & Refining Co., 6540 S. Central Ave., Chicago, Ill.
Oil-American Burner Corp., 123 Hawthorne St., Roselle Park, N. J.
●Oil Burner Builders, Inc., 440 13th St., Rock Island, Ill.
Orbon Stove Co., L. & N. and Sycamore St., Belleville, Ill.
Ormsby-Gray Combustion Service, Inc., 6625 Delmar Blvd., St. Louis, Mo.
●Osborn Co., J. M. & L. A., 1541 E. 38th St., Cleveland, O.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
Otis Steel Co., 3341 Jennings Rd., Cleveland, O.
OverSpred Stoker Co., Fulton, Jackson & Jefferson Sts., Ottawa, Ill.
●Owens-Illinois Glass Co., Newark, O.

P

●Pacific Gas Radiator Co., 7615 Roseberry St., Huntington Park, Cal.
Pacific Lumber Co., 102 Bush St., San Francisco, Cal.
Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco, Cal.
Packham Crimper Co., Mechanicsburg, O.
Page Steel & Wire Div. of American Chain Co., Inc., Monessen, Pa.
Palmer Electric Co., 1258 Park Pl., Detroit, Mich.
Pan American Engineering Corp., Ltd., 820 Parker St., Berkeley, Cal.
Paragon Electric Co., 37 W. Van Buren St., Chicago, Ill.
Paragon Kol-Master Corp., Oregon, Ill.
Park City Cornice Works, Inc., 56 McKinley Ave., Bridgeport, Conn.
●Parker-Kalon Corp., 190 Varick St., New York City.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Parks-Cramer Co., 970 Main St., Fitchburg, Mass.
Patten Co., J. V., 500 DeKalb Ave., Sycamore, Ill.
Patterson Foundry & Machine Co., East Liverpool, O.
●Payne Furnace & Supply Co., 338 N. Foothill Rd., Beverly Hills, Cal.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co., 4th St. & Erie Ave., Philadelphia, Pa.
●Peerless Electric Co., W. Market, Warren, O.
●Peerless Foundry Co., 1853 Ludlow Ave., Indianapolis, Ind.
Peerless Ice Machine Co., 515 W. 35th St., Chicago, Ill.
Peerless Oil Burner Co., Inc., 3926 Main St., Kansas City, Mo.
Pels & Co., Inc., Henry, 90 West St., New York City.
Pencilsharp Awl & Tool Co., 1423-25 E. Illinois St., Evansville, Ind.
Penn Electric Switch Co., E. 20th & Walnut, Des Moines, Ia.
Pennsylvania Engineering Works, New Castle, Pa.
Pennsylvania Furnace & Iron Co., Pine St., Warren, Pa.
Pentecost & Craft Co., 429 Wabash Ave., Terre Haute, Ind.
Peoples Oil Burner Co., 466 W. Superior St., Chicago, Ill.
Perfect Burner Co., 294 Broad St., Lynn, Mass.
Perfectaire Corp., 1102 N. Charles St., Baltimore, Md.
Perfection Stove Co., 7609 Platt Ave., Cleveland, O.
Perfex Controls Co., 415 W. Oklahoma Pl., Milwaukee, Wis.
Perkins & Son, Inc., B. F., Chicopee & Montgomery Sts., Holyoke, Mass.
Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
Perkinson & Brown, 412 N. Lincoln St., Chicago, Ill.
Peterson Freezem Mfg. Co., 2620 Charlotte St., Kansas City, Mo.
Petroleum Heat & Power Co., Stamford, Conn.
Petrometer Corp., 1 Star Sq., Long Island City, N. Y.
Pfanstiehl Chemical Co., 104 Lakeview Ave., Waukegan, Ill.
Philadelphia Metal Stamping Co., 107 Erie St., Camden, N. J.
Phillips Heating, Ventilating & Mfg. Co., 1710 W. Washington St., Los Angeles, Cal.
Piatt Products Corp. 306 Clinton St., Lansing, Mich.
Pier Equipment Mfg. Co., Milton & Cross Sts., Benton Harbor, Mich.
Pilley Packing and Flue Brush Mfg. Co., 606 S. 3rd St., St. Louis, Mo.
Pioneer Heat Regulator Corp., 100 Davis Ave., Dayton, O.
Pittsburgh Equitable Meter Co., 400 N. Lexington Ave., Pittsburgh, Pa.
●Pittston Stove Co., P. O. Box 29, Pittston, Pa.
Plastic Products Co., 6475 Georgia Ave., Detroit, Mich.
Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago, Ill.
Plymouth Cordage Co., North Plymouth, Mass.
Plymouth Industries, Inc., Plymouth, Ind.
Pneumercator Co., Inc., 305 E. 46th St., New York City.
Pomona Pump Co., 206 E. Commercial St., Pomona, Cal.
Portable Power Tool Corp., 310 E. Market St., Warsaw, Ind.
Potomac Mfg. Co., 316 S. 10th St., Philadelphia, Pa.
Powell Co., William, 2521-31 Spring Grove Ave., Cincinnati, O.
Powers Regulator Co., 2720 Greenview Ave., Chicago, Ill.
Practical Instrument Co., 2717 N. Ashland Ave., Chicago, Ill.
Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia, Pa.
●Premier Division, Electric Vacuum Cleaner Co., Inc., 1734 Ivanhoe Rd., Cleveland, O.
Premier Furnace Co., Dowagiac, Mich.
Presstite Engineering Co., 3900 Chouto St., St. Louis, Mo.
Pressure Oil Burners, Inc., 55 N. Broad St., York, Pa.
Production Plating Works, 123 W. Main St., Lebanon, O.
Propellair, Inc., 1345 Lagonda Ave., Springfield, O.
●Providence Cornice Co., 309 Canal St., Providence, R. I.
Pryne & Co., Inc., 1245 E. 38rd St., Los Angeles, Cal.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago, Ill.
●Pyrolite Products Co., 1221-31 W. 74th St., Cleveland, O.

Q

Quaker Mfg. Co., 223 W. Erie St,, Chicago, Ill.
Quickwork Co., St. Marys, O.
Quimby Pump Co., Inc., 340 Thomas St., Newark, N. J.
Quist Furnace & Mfg. Co., 3202 W. Vliet St., Milwaukee, Wis.

R

R-S Products Corp., 4530 Germantown Ave., Philadelphia, Pa.
Racine Sheet Metal Works, Olive & Lathrop Sts., Racine, Wis.
Racine Stoker Mfg. Co., 1014 Eighth St., Racine, Wis.
Rafter Machine Co., 259 Stephen St., Belleville, N. J.
Ramey Mfg. Co., 243 N. 5th St., Columbus, O.
Ramtite Co., Division of S. Obermayer Co., 2563 W. 18th St., Chicago, Ill.
●Randall Graphite Products Corp., 609 W. Lake St., Chicago, Ill.
Ravenna Furnace & Heating Co., Ravenna, O.
Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco, Cal.
Reading Iron Co., 401 N. Broad St., Philadelphia, Pa.
Red Devil Mfg. Co., P. O. Box 244, Palatine, Ill.
Redi Automatic Coal Burners, Inc., N. 107 Freyer St., Spokane, Wash.
Reed Unit-Fans, Inc., 730-34 St. Charles St., New Orleans, La.
Reeves Mfg. Co., Dover, O.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester, N. Y.
Regal Metal Products Co., 111 W. Washington St., Chicago, Ill.
Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn, N. Y.
Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo, O.
Reif-Rexoil, Inc., 37 Carroll St., Buffalo, N. Y.
Reilly Tar & Chemical Co., 1615 Merchants Bank Bldg., Indianapolis, Ind.
Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, O.
Reliance Refrigeration Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.
Rempe Coil Co., 340 N. Sacramento Ave., Chicago, Ill.
●Republic Steel Corp., Republic Bldg., Cleveland, O.
Research Corp., 405 Lexington Ave., New York City.
●Revere Copper & Brass, Inc., 230 Park Ave., New York City.
Reynolds Corp., 19 Rector St., New York City.
Reznor Mfg. Co., Mercer, Pa.
Rhoads & Sons, J. E., 35 N. Sixth St., Philadelphia, Pa.
Rhodes, Inc., M. H., Rockefeller Center, New York City.
Ribside Furnace Co., 119½ Clinton St., Wausau, Wis.
Richards-Wilcox Mfg. Co., Third St., Aurora, Ill.
●Richardson & Boynton Co., 244 Madison Ave., New York City.
Richmond Fireproof Door Co., Richmond, Ind.
Ridgely Trimmer Co., Kenton St., Springfield, O.
Ripley Co., W. R., 318 N. "E" St., Tacoma, Wash.
Rising & Nelson Slate Co., West Pawlet, Vt.
Roan Mfg. Co., 1220 Washington Ave., Racine, Wis.
Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, O.
Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo, N. Y.
Roberts-Hamilton Co., 707-715 S. Third St., Minneapolis, Minn.
Robertshaw Thermostat Co., Youngwood, Pa.
Robertson Co., H. H., Grant Bldg., Pittsburgh, Pa.
Robeson Engineering Co., 212 S. Burnet St., East Orange, N. J.
Robinson Furnace Co., 213 W. Austin Ave., Chicago, Ill.
Robinson Heating & Ventilating Corp., 632-646 Erie St., S., Massillon, O.
Rochester Lead Works, Inc., 380 Exchange St., Rochester, N. Y.
Rochester Mfg. Co., Inc., Rockwood St., Rochester, N. Y.
●Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.
Rock Island Stove Co., 200 Fourth St., Rock Island, Ill.
Rock River Machine Co., Inc., N. Main St., Janesville, Wis.
Rockwood Mfg. Co., 1801 English Ave., Indianapolis, Ind.
Rock Wool Products Co., Inc., P. O. Box 276, Wabash, Ind.
Roebling's Sons Co., John A., 640 S. Broad St., Trenton, N. J.
Roller Bearing Co. of America, Whitehead Rd., Trenton, N. J.
Rome-Turney Radiator Co., Canal St., Rome, N. Y.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Blackhawk Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
Rosedale Foundry & Machine Co., Columbus Ave., N. S., Pittsburgh, Pa.
Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles, Cal.
●Round Oak Co., Dowagiac, Mich.
Roxalin Flexible Lacquer Co., 800 Magnolia Ave., Elizabeth, N. J.
Royal Metal Products Co., 58 Schenectady Ave., Brooklyn, N. Y.

Royal Ventilator Co., 415 Locust St., Philadelphia, Pa.
Ruberoid Co., 500 Fifth Ave., New York City.
●Ruby Chemical Co., 74 McDowell St., Columbus, O.
●Rudy Furnace Co., Dowagiac, Mich.
Rupp Forge & Shear Co., 10312 Meech Ave., Cleveland, O.
●Russell Electric Co., 342 W. Huron St., Chicago, Ill.
Russell Mfg. Co., John M., Naugatuck, Conn.
Rutland Fire Clay Co., Curtis Ave., Rutland, Vt.
●Rybolt Heater Co., Eighth St., Ashland, O.
●Ryerson & Son, Inc., Joseph T., 2558 W. 16th St., Chicago, Ill.
Ryniker Sheet Metal Works, Inc., 122-124 N. 25th St., Billings, Mont.

S

S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.
Safe Automatic Heat Control Co., 16512 Wark Ave., Detroit, Mich.
Saino Mfg. Co., Inc., F. L., 70 W. Colorado Ave., Memphis, Tenn.
St. Clair Foundry Corp., Beech & Wilson Sts., Centralia, Ill.
St. Paul Corrugating Co., Wabash & Water Sts., St. Paul, Minn.
●Sall Mountain Co., 176 W. Adams St., Chicago, Ill.
Sallada Mfg. Co., 3816 Grand Ave., S., Minneapolis, Minn.
Sampsel-Mastoker Co., E. Main St., Lafayette, Ind.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
Sauereisen Cements Co., 2308 Main St., Sharpsburg, Pa.
Savage Arms Corp., 100 E. 42nd St., New York City.
●Schaefer Brush Mfg. Co., 1009 S. 2nd St., Milwaukee, Wis.
Schatz Mfg. Co., Fairview, Poughkeepsie, N. Y.
Schill Mfg. Co., Mansfield St., Crestline, O.
Schoedinger Co., F. O., 322-358 Mt. Vernon Ave., Columbus, O.
Schwab Gilt Edge Furnace & Mfg. Co., 123 Gilt Edge Ave., Cedar Grove, Wis.
●Schwitzer-Cummins Co., 1125 Massachusetts Ave., Indianapolis, Ind.
Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo.
●Scovill Mfg. Co., Morency-Van Buren Div., Prairie Ave., Sturgis, Mich.
Security Stove & Mfg. Co., 1630 Oakland, Kansas City, Mo.
Sentry Mfg. Co., 430 Omaha Building & Loan Association Bldg., Omaha, Nebr.
Servel, Inc., Evansville, Ind.
Service Machine Co., 158 Mill Rd., Elizabeth, N. J.
Shedlov Oil Burners, Inc., 717 Third Ave., S., Minneapolis, Minn.
Sheer Co., H. M., 2nd & Hampshire Sts., Quincy, Ill.
Sheet Metal Products Co., 320 S. Commercial St., Peoria, Ill.
Sheldon & Co., E. H., 149 Thomas St., Muskegon, Mich.
Sheldon Slate Co., F. C., Granville, N. Y.
Sight Feed Generator Co., 4-8 N. 16th St., Richmond, Ind.
Silent Glow Oil Burner Corp., 1477 Park St., Hartford, Conn.
Silent Sioux Oil Burner Corp., Orange City, Ia.
Simplex Oil Heating Corp., 30 Church St., New York City.
Sinker-Davis Co., 230 S. Missouri St., Indianapolis, Ind.
Skilbeck Mfg. Co., 6721 26th Ave., Kenosha, Wis.
Skilsaw, Inc., 3310-20 Elston Ave., Chicago, Ill.
Skinner Co., E. W., 402 Pearl St., Fitchburg, Mass.
Skuttle Co., J. L., 4308 W. Fort St., Detroit, Mich.
Sly Mfg. Co., W. W., 4700 Train Ave., Cleveland, O.
Smith & Kanzler, Inc., 516 Lidgerwood Ave., Elizabeth, N. J.
Smith, Inc., Winfield H., Eaton St., Springville, N. Y.
Smith Welding Equipment Corp., 2619-33 Fourth St., S. E., Minneapolis, Minn.
Smuck-Thiele Co., 410 W. Tenth St., Indianapolis, Ind.
Somers Air Filter Sales Co., 7310 Woodward Ave., Detroit, Mich.
Somers, Inc., H. J., 1984 W. Lafayette Blvd., Detroit, Mich.
Sonner Burner Co., 6th & Andrews, Winfield, Kan.
Southbridge Roofing Co., Inc., Hartwell & Chapin Sts., Southbridge, Mass.
Southern States Iron Roofing Co., Stiles Ave., Savannah, Ga.
Spear Stove & Heating Co., James, 1823 Market St., Philadelphia, Pa.
Spencer Air Conditioning Service, 1237 Acoma St., Denver, Colo.
Spencer Thermostat Co., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., Hartford, Conn.
Sprayo-Flake Co., 836 E. Bay St., Milwaukee, Wis.
Spray-Wheel Air Conditioners, Inc., 1226 California St., Denver, Colo.
Springman Metal Specialty Co., 424 Bellevue Ave., Detroit, Mich.
Spun Steel Corp., 2037 Dueber Ave., S. W., Canton, O.
Square D Co., 6060 Rivard St., Detroit, Mich.
Standard Air Conditioning, Inc., 40 W. 40th St., New York City.
Standard Asbestos Mfg. Co., 820-22 W. Lake St., Chicago, Ill.
Standard Engineering Works, 289 Roosevelt Ave., Pawtucket, R. I.
●Standard Foundry & Furnace Co., 1801 Pleasant St., De Kalb, Ill.
Standard Furnace & Supply Co., 407-13 S. 10th St., Omaha, Nebr.
Standard Galvanizing Co., 2619 W. Van Buren St., Chicago, Ill.
Standard Heating & Radiator Co., 220 Penn Ave., Pittsburgh, Pa.
Standard Lime & Stone Co., 2004 First National Bank Bldg., Baltimore, Md.
Standard Rolling Mills, Inc., 143 Jewell St., Brooklyn, N. Y.
Standard Stamping & Perforating Co., 3131 W. 49th Pl., Chicago, Ill.
Standard Ventilator Co., Lewisburg, Pa.
●Stanley Works, 195 Lake St., New Britain, Conn.
Stanton Heater Co., Martins Ferry, O.
Star Electric Motor Co., 197 Grove St., Bloomfield, N. J.
Star Expansion Bolt Co., 147 Cedar St., New York City.
Stat-Amatic Instrument & Appliance Co., 19 New Park Ave., Hartford, Conn.
Staynew Filter Corp., 25 Leighton Ave., Rochester, N. Y.
Steel and Tubes, Inc., 224 E. 131st St., Cleveland, O.
Steelweld Machinery Co., E 70th & Machinery Ave., Cleveland, O.
Steen-Dyer Mfg. Co., 5204 E. 15th St., Kansas City, Mo.
Stefco Steel Co., Michigan City, Ind.
Sterling Foundry Co., Sterling, Ill.
Stewart Foundry, O. S., 887 E. 67th St., Cleveland, O.
Stiglitz Furnace & Foundry Co., 2007-23 Portland Ave., Louisville, Ky.
Stilphen Engineering & Mfg. Co., C. A., 1129 Eighteenth St., Denver, Colo.
Sto-Coke Incorporated, 3525 E. Washington St., Indianapolis, Ind.
Stok-A-Fire Co., 2714 Big Bend Blvd., St. Louis, Mo.
Stoker Equipment Co., 424 N. Main Ave., Sidney, O.
Stoker-Matic Corp., 1415 S. State St., Salt Lake City, Utah.
Stoker Products, Inc., 221-5 W. Prairie Ave., Decatur, Ill.
Stone, Junius H., 1265 Broadway, New York City.
Stover Mfg. & Engine Co., N. Henderson Ave., Freeport, Ill.
Stran-Steel Corp., 6100 McGraw Ave., Detroit, Mich.
Stratton & Terstegge Co., 15th & Main St., Louisville, Ky.
Structural Slate Co., Pen Argyl, Pa.
Struthers Dunn, Inc., 139 N. Juniper St., Philadelphia, Pa.
Sturtevant Co., B. F., Damon St., Hyde Park, Boston, Mass.
Summerheat Co., 406 S. Columbia, South Bend, Ind.
Sundstrand Sales Co., 2592 Ninth St., Rockford, Ill.
Sun-Ray Oil Burner Corp., 114-02 Beach Channel Dr., Rockaway Park, N. Y.
Super-Aire Co., 3032 Olive St., St. Louis, Mo.
Superior Sheet Steel Co., Division of Continental Steel Corp., Canton, O.
Superior Steel Corp., Grant Bldg., Pittsburgh, Pa.
Superstat Co., 38 Walter St., Springfield, Mass.
Supreme Electric Products Corp., 79 Mt. Hope Ave., Rochester, N. Y.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.
Swaby Mfg. Co., 2010-2014 Marshall Blvd., Chicago, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis, Mo.
●Swartwout Co., 18615 Euclid Ave., Cleveland, O.
Swift Corp., Carl E., North Side, Holland, Mich.
Syncro-Flame Burner Corp., 1200 Park St., Hartford, Conn.
Syncromatic Air Conditioning Corp., 1317 N. Third St., Milwaukee, Wis.
Syracuse Fire Door Corp., 900 Canal St., Syracuse, N. Y.

T

Taber Pump Co., 291 Elm St., Buffalo, N. Y.
Taco Heaters, Inc., 342 Madison Ave., New York City.
Tagliabue Mfg. Co., C. J., Park & Nostrand Aves., Brooklyn, N. Y.
●Tamms Silica Co., 228 N. La Salle St., Chicago, Ill.
Tatro Brothers, Inc., 218 Washington St., Decorah, Ia.
Taylor Equipment Co., 1924 Westwood Ave., Cincinnati, O.
Taylor-Hall Welding Corp., 99 Hope Ave., Worcester, Mass.
Taylor Instrument Companies, 95 Ames St., Rochester, N. Y.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Teesdale Mfg. Co., 427 Market St., Grand Rapids, Mich.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Texo Sales & Mfg. Co., 47 Walnut St., Cincinnati, O.
Thatcher Co., 39 St. Francis St., Newark, N. J.
Thermal Units Mfg. Co., 64 E. 25th St., Chicago, Ill.
Thermax Division, Northwest Magnesite Co., Farmers Bank Bldg., Pittsburgh, Pa.
Therminsul Corp. of America, 1603 Fulford St., Kalamazoo, Mich.
Thermoid Rubber Co., Whitehead Rd., Trenton, N. J.
●Thompson & Co., Box 6757, Pittsburgh, Pa.
●Thompson Mfg. Co., 30th & Larimer Sts., Denver, Colo.
Thomson-Gibb Electric Welding Co., 161 Pleasant St., Lynn, Mass.
Tierney Rotor Ventilator Co., 239 4th Ave., S., Minneapolis, Minn.
Tiffin Art Metal Co., Broad & Second Ave., Tiffin, O.
Tillery's Little Janitor Clock Co., 55-57 Orchard St., Newark, N. J.
Timken Silent Automatic Co., 100 Clark Ave., Detroit, Mich.
Todd Oil Burner Corp., 25 Broadway, New York City.
Torchweld Equipment Co., 1035 W. Lake St., Chicago, Ill.
●Tork Clock Co., Inc., Graybar Bldg., New York City.
Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.
Townsend Co., New Brighton, Pa.
Trane Co., La Crosse, Wis.
Trimount Rotary Power Co., 296 Whiting Ave., East Dedham, Mass.
Triox Engineering Co., 339 N. Taylor, St. Louis, Mo.

Tropical Paint & Oil Co., 1244-86 W. 70th St., Cleveland, O.
Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn.
Truscon Steel Co., Albert St., Youngstown, O.
Turner & Seymour Mfg. Co., Lawton St., Torrington, Conn.
Turner Brass Works, 823 Park Ave., Sycamore, Ill.
Turney Corp., Muskegon, Mich.
Tuthill Pump Co., 131 W. 63rd St., Chicago, Ill.
Tuttle Air Filter Co., Inc., 1014 W. Main St., Louisville, Ky.
Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
●Twentieth Century Heating & Ventilating Co., Ira & Edison Ave., Akron, O.

U

U. S. L. Battery Co., 1800 Highland Ave., Niagara Falls, N. Y.
Uehling Instrument Co., 21 Vesper St., Paterson, N. J.
Una Welding, Inc., 1615 Collamer Ave., Cleveland, O.
Unified Air Conditioner Co., 322 W. Michigan St., Duluth, Minn.
Uni-Fire Co., 2601 16th, Detroit, Mich.
Uniflow Mfg. Co., Erie, Pa.
Union Fibre Co., Inc., Winona, Minn.
Union Metal Mfg. Co., 1432 Maple Ave., N. E., Canton, O.
Union Steam Pump Co., Battle Creek, Mich.
United American Bosch Corp., 3664 Main St., Springfield, Mass.
United Cork Companies, Grant Ave., Lyndhurst, N. J.
United Electric Controls Co., 69 "A" St., South Boston, Mass.
United Screw & Bolt Corp., 3590 W. 58th St., Cleveland, O.
U. S. Air Conditioning Corp., 2101 Kennedy St., N. E., Minneapolis, Minn.
United States Brass & Copper Co., Hyde Park Ave., Hyde Park, Mass.
United States Burner Corp., 191 Franklin Ave., Hartford, Conn.
United States Gypsum Co., 300 W. Adams St., Chicago, Ill.
U. S. Mineral Wool Co., 280 Madison Ave., New York City.
U. S. Pressed Steel Products Co., P. O. Box 863, 763 E. Vine St., Kalamazoo, Mich.
United States Radiator Corp., 1056 National Bank Bldg., Detroit, Mich.
●United States Register Co., Battle Creek, Mich.
Universal Blower Co., 124 S. Woodward Ave., Birmingham, Mich.
Universal Cooler Corp., 7214 Melville St., Detroit, Mich.
Universal Fittings & Scaffolding Co., 600 Sloan St., Blairsville, Pa.
Universal Power Corp., 1719 Clarkstone Rd., Cleveland, O.
Uno Ventilator Co., 339 Lincoln Ave., Cliftondale, Mass.
Upson Quality Products, Inc., Lockport, N. Y.

V

Vail Mfg. Co., 1017 Columbia Ave., Fort Wayne, Ind.
Valley Mfg. Co., Fryeville, Athol, Mass.
Van Noorden Co., E., 100 Magazine St., Boston, Mass.
Vendor Slate Co., Inc., P. O. Box 33, Nazareth, Pa.
Vent-O-Lite Co., 4230 W. Taylor St., Chicago, Ill.
Vermont Structural Slate Co., Fair Haven, Vt.
Vibration Eliminator Co., 41-26 37th St., Long Island City, N. Y.
●Victor Electric Products, Inc., 748 Reading Rd., Cincinnati, O.
Victor Equipment Co., Kimball-Krogh Pump Div., 1010 E. 62nd St., Los Angeles, Cal.
Victor Oil Burner Mfg. Co. 45 Allyn St., Hartford, Conn.
Viking Air Conditioning Corp., 1935 Euclid Ave., Cleveland, O.
Viking Pump Co., 404 State St., Cedar Falls, Ia.
●Viking Shear Co., Pittsburgh Ave., Erie, Pa.
Vilter Mfg. Co., 2217 S. First St., Milwaukee, Wis.
Volcano Burner Corp., 575 E. 184th St., New York City.

W

Waddell, Bruce, 2829 Northwestern Ave., Indianapolis, Ind.
Wagner, C. DeWitt, 1000 2nd St., S. E., Cedar Rapids, Ia.
Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.
Walker & Pratt Mfg. Co., 31-35 Union St., Boston, Mass.
Walker Mfg. & Sales Corp., 613 Locust St., St. Joseph, Mo.
Wall Mfg. Supply Co., P., 3126 Preble Ave., Pittsburgh, Pa.
●Walsh Refractories Corp., 4430 N. First St., St. Louis, Mo.
Ward Heater Co., Ltd., 1800 W. Washington Blvd., Los Angeles, Cal.
Ward Leonard Electric Co., 37 South St., Mt. Vernon, N. Y.
●Ward Machinery Co., 564 W. Washington Blvd., Chicago, Ill.
Ward Mfg. Co., 107-11 E. Milwaukee Ave., Detroit, Mich.
Washington Stove Works, 3402-22 Smith Ave., Everett, Wash.
●Waterloo Register Co., Waterloo, Ia.
●Waterman-Waterbury Co., 1122 Jackson St., N. E., Minneapolis, Minn.
Watson Co., Inc., Jas. H., Bradley, Ill.
Wayne Oil Burner Corp., 800 Glasgow Ave., Fort Wayne, Ind.
Wayne Pattern & Foundry Co., 236 Murray St., Fort Wayne, Ind.
Webster Electric Co., Dekoven Ave. & Clark St., Racine, Wis.
Weinman Pump Co., 290 Spruce St., Columbus, O.
Weirton Steel Co., Weirton, W. Va.
Weiskittel Co., Inc., Harry C., 4901 Philadelphia Rd., Baltimore, Md.
Weiss & Co., H., 113-115 Mercer St., New York City.
Weldex, Inc., 9666 E. Jefferson St., Detroit, Mich.
Welding Apparatus Co., 1741 Dickson St., Chicago, Ill.
Welding Service Sales, Inc., 954 Howard St., San Francisco, Cal.
Weldum Products Co., Inc., Lock Box 92, Indianapolis, Ind.
Westchester Home Equipment Co., Inc., 432 Austin Pl., Bronx, N. Y.
Westco Pump Corp., Front & Gaines St., Davenport, Ia.
Western Blower Co., 1800 Airport Way, Seattle, Wash.
Western Felt Works, 4027 Ogden Ave., Chicago, Ill.
Western Furnaces, Inc., 3002-18 S. Chandler St., Tacoma, Wash.
Western Rotary Ventilator Co., Inc., 1720 E. 14th St., Los Angeles, Cal.
Western Wire & Iron Works, Inc., 951 W. 18th Pl., Chicago, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. and Mansfield, O.
Westwick & Son, Inc., John, Galena, Ill.
Wheeling Corrugating Co., Wheeling Steel Bldg., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Box 56, Wheeling, W. Va.
Wheeling Steel Corp., Wheeling Steel Bldg., Wheeling, W. Va.
●White Mfg. Co., 2362 University Ave., St. Paul, Minn.
Whiting Corp., Harvey, Ill.
Whitlock Coil Pipe Co., 100 South St., Hartford, Conn.
●Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.
●Whitney Metal Tool Co., 91 Forbes St., Rockford, Ill.
●Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.
Wilder Metal Co., Niles, O.
Wilhelm Co., A., 3rd & Bern Sts., Reading, Pa.
Willard Metallic Crypt Co., Willard, O.
●Will-Burt Co., Orrville, O.
Williams Oil-O-Matic Heating Corp., 1201 E. Bell, Bloomington, Ill.
Williamson Heater Co., 337 W. Fifth St., Cincinnati, O.
Willis Mfg. Co., 156 N. Academy St., Galesburg, Ill.
Will-Weld Mfg. Co., Inc., 1501 Jackson St., Omaha, Nebr.
●Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago, Ill.
Wilson, Inc., Grant, 4101 W. Taylor St., Chicago, Ill.
Wilson Welder & Metals Co., Inc., 956 38th St., North Bergen, N. J.
Winchester Repeating Arms Co., 275 Winchester Ave., New Haven, Conn.
Windshield Scupper Co., 16 Warren St., New York City.
Wing Mfg. Co., L. J., 154 W. 14th St., New York City.
●Wisconsin Humidifier Co., 3231 N. Richards St., Milwaukee, Wis.
●Wise Furnace Co., 101 Lincoln St., Akron, O.
Wiss & Sons Co., J., 33 Littleton Ave., Newark, N. J.
Wittenmeier Machinery Co., 850 N. Spaulding Ave., Chicago, Ill.
Wolff Coal Saver Co., 1330 W. Congress St., Chicago, Ill.
Wolverine Tube Co., 1411 Central Ave., Detroit, Mich.
Wood Conversion Co., First National Bank Bldg., St. Paul, Minn.
●Wood Industries, Inc., Gar, 7924 Riopelle St., Detroit, Mich.
Wood Steel Co., Alan, Conshohocken, Pa.
Wood's Sons Co., T. B., Fifth Ave., Chambersburg, Pa.
Woolery Machine Co., 2919 Como Ave., S. E., Minneapolis, Minn.
Woolwine Metal Products Co., Atlantic Blvd. & S. Riverside Dr., Los Angeles, Cal.
Wooster Art Wood, Inc., P. O. Box 198, Wooster, O.
Worcester Brush & Scraper Co., Div. Mason Worcester Co., 38 Austin St., Worcester, Mass.
World Kalamein Sash & Door Corp., 448 Tiffany St., New York City.
Worthington Pump & Machinery Corp., Worthington Ave., Harrison, N. J.
Wurlitzer Mfg. Co., Rudolph, Falls Blvd., North Tonawanda, N. Y.

X

XL Refrigerating Co., Inc., 1834 W. 59th St., Chicago, Ill.
●XXth Century Heating & Ventilating Co., Ira & Edison Ave., Akron, O.

Y

Yardley Screen & Weather Strip Corp., 142 Parsons Ave., Columbus, O.
Yeomans Bros. Co., 1433 Dayton St., Chicago, Ill.
Yoder Co., 5500 Walworth Ave., Cleveland, O.
York Corrugating Co., Adams St. & WM RR., York, Pa.
York Ice Machinery Corp., Roosevelt Ave., York, Pa.
York Oil Burner Co., Inc., Broad St., York, Pa.
Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati, O.
Young Radiator Co., Racine, Wis.
Young Ventilating Co., 2703 Woodland Ave., Cleveland, O.
Youngstown Pressed Steel Co., Warren, O.
Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O.

Z

Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.